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March 29, 2005

Mr. Dan McMindes
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Sacramento, California 95814

Subject: Keysor Century Corporation, Sampling and Analysis Plan

Attached is the Sampling and Analysis Plan (SAP) for the Keysor Century Corporation site, prepared by Weston Solutions, Inc. (WESTON). Also included are the Data Quality Objective Process Worksheet, Site-Specific Health and Safety Plan, and Instructions for Sample Shipping and Documentation. Appendix A is not included in the SAP because WESTON has not received the Coordination Sheet for the Keysor site.

If you have any questions regarding this report, please do not hesitate to contact me at (707) 839-3659 or a.cohan@westonsolutions.com.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "A K Cohan", followed by a horizontal line.

Amanda K. Cohan
Site Leader

Attachments

0946 - 2111 887



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March 29, 2005

Mr. Matt Mitguard
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

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**Keysor Century Corporation
Saugus, California
Expanded Site Inspection
Sampling and Analysis Plan**

**USACE Contract Number: DACA45.98.D0004, Task Order 25
Document Control Number: 20074.025.136**

July 2004

**Prepared for:
U.S. Environmental Protection Agency
Region 9**

**Prepared by:
Weston Solutions, Inc.
14724 Ventura Blvd., Suite 1000
Sherman Oaks, California 91403**

0946-2111887

**Keysor Century Corporation
Saugus, California
Extended Site Inspection
Sampling and Analysis Plan**

EPA ID: CAD00953191

**USACE Contract Number: DACA45.98.D0004, Task Order 25
Document Control Number: 20074.025.136**

Approved by: _____
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LIST OF ACRONYMS

AOC	Analyte of Concern
ARCH	Air Rotary with Casing Hammer
AST	Aboveground Storage Tank
bgs	below ground surface
BOD	Biochemical Oxygen Demand
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
CLPAS	Contract Laboratory Program Analytical Services
CRDL	Contract Required Detection Limits
CUPA	Los Angeles County Certified Unified Program Agency
DCA	Dichloroethane
DCE	Dichloroethene
DQO	Data Quality Objective
DQI	Data Quality Indicator
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESI	Expanded Site Inspection
FM	Field Manager
HCl	Hydrochloric Acid
HRS	Hazard Ranking System
HSA	Hollow Stem Auger
IDW	Investigation-Derived Wastes
LACDWP	Los Angeles County Department of Public Works
LACFD	Los Angeles County Fire Department
LACSD	Los Angeles County Sanitation District
LCS	Laboratory Control Samples
NPDES	National Pollutant Discharge Elimination System
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NCP	National Contingency Plan
NOV	Notice Of Violation
NPL	National Priorities List
OERR	Office of Emergency and Remedial Response
PA/SI	Preliminary Assessment/Site Inspection
PM	Project Manager
ppb	parts per billion
PPE	Personal Protective Equipment
PVC	Polyvinyl chloride
QA	Quality Assurance
QAO	Quality Assurance Office

List of Acronyms (continued)

QC	Quality Control
RPD	Relative Percent Difference
RWQCB	Los Angeles Regional Water Quality Control Board
SAM	Site Assessment Manager
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCAQMD	South Coast Air Quality Management District
SVOC	Semivolatile Organic Compound
TBA	To Be Announced
TCE	Trichloroethene
TIC	Tentatively identified compound
TMB	Trimethylbenzene
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank
VOC	Volatile Organic Compound
µg/kg	Micrograms per kilogram
µg/l	Micrograms per liter

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), Weston Solutions, Incorporated (WESTON®) has been tasked to conduct a Hazard Ranking System (HRS) Expanded Site Inspection (ESI) of the Keysor Century Corporation (Keysor) site, located in Saugus, Los Angeles County, California. The HRS assesses the relative threat associated with actual or potential releases of hazardous substances to the environment, and has been adopted by the U.S. Environmental Protection Agency (EPA) to assist in setting priorities for further site evaluation and eventual remedial action. The HRS is the primary method for determining a site's eligibility for placement on the National Priorities List (NPL). The NPL identifies sites where the EPA may conduct remedial actions.

This Sampling and Analysis Plan (SAP) describes the project and data use objectives, data collection rationale, quality assurance goals, and requirements for sampling and analysis activities. The SAP also defines the sampling and data collection methods that will be used for this project. The SAP is intended to accurately reflect the planned data-gathering activities for this site investigation; however, site conditions and additional EPA direction may warrant modifications. All significant changes will be documented in the final report. If problems are encountered and additional characterization of the site is indicated, an addendum will be made to the plan that documents these findings and provides procedures and a design for additional site characterization.

WESTON has been tasked to gather and review existing available information regarding site conditions, identify and fill data gaps, and prepare HRS scoresheets and rationale for the site.

1.1 Project Organization

The coordination sheet is presented in Appendix A. The following is a list of project personnel and their responsibilities:

EPA Site Assessment Manager (SAM) - The EPA SAM is Matt Mitguard. Mr. Mitguard is the primary decision maker for this investigation and is the primary contact for the WESTON Project Manager.

WESTON Project Manager (PM) and Field Sampling Quality Control (QC) Coordinator - The WESTON PM and Field Sampling QC Coordinator is Carol Yuge. Ms. Yuge is responsible for the overall performance of all tasks assigned to WESTON by the EPA and working with the EPA Quality Assurance Office (QAO) to ensure project quality assurance goals are met.

WESTON Quality Assurance (QA) Manager - The WESTON QA Manager is Joe DeFao. Mr. DeFao is responsible for working with the United States Army Corps of Engineers (USACE) and EPA Quality Assurance Offices (QAO) to ensure project quality assurance goals are met.

WESTON Field Manager (FM) - The WESTON field manager is Amanda K. Cohan. Ms. Cohan is responsible for preparing the SAP; working with the laboratories; implementing the sampling design; collecting, handling, documenting, and transporting samples; generating field documentation of sampling activities; and working with the WESTON QC Coordinator to ensure project quality assurance goals are met.

Analytical Laboratory - The EPA QAO will arrange for laboratory services and data validation activities.

Table 1-1: Organizational Chart

Title/Responsibility	Name	Phone Number
EPA Site Assessment Manager	Matt Mitguard	(415) 972-3096
USEPA Quality Assurance Manager	Vance S. Fong, P.E.	(415) 972-3798
USACE Project Manager	Dan McMindes	(916) 557-7399
WESTON Project Manager and Field Sampling QC Coordinator	Carol Yuge	(818) 382-1803
WESTON QA Manager	Joe DeFao	(925) 948-2656
WESTON Field Manager	Amanda K. Cohan	(707) 839-3659
EPA Region 9 Sample Control Coordinator	Mary O'Donnell	(510) 412-2389

1.2 Distribution List

Copies of the final SAP will be distributed to the following persons and organizations:

- Matt Mitguard, EPA Region 9
- EPA Region 9 Quality Assurance Office
- Dan McMindes, USACE
- John Esparza, USACE QAO
- Weston Solutions, Inc. files

1.3 Statement of the Specific Problem

Since 1958, the Keysor site has been operating as a resin compound manufacturer facility, producing polyvinyl chloride resins and compounds. The polyvinyl chloride resins and compounds are produced from a polymerization reaction that uses volatile organic compounds (VOCs) as raw materials. Reportedly, Keysor ceased resin manufacturing operations in December 2002 (1, 2).

From 1958 until 1978, Keysor used an unlined pond located on site for disposal of waste liquids and solids produced during the manufacturing process. The County of Los Angeles, Department of Health Services ordered that the pond be closed in January 1977; however, Keysor continued to discharge into the pond illegally until approximately September 1978. Additionally, several spills have been reported on site, including but not limited to, wastewater spills and processed water spills (3, 4, 5, 6).

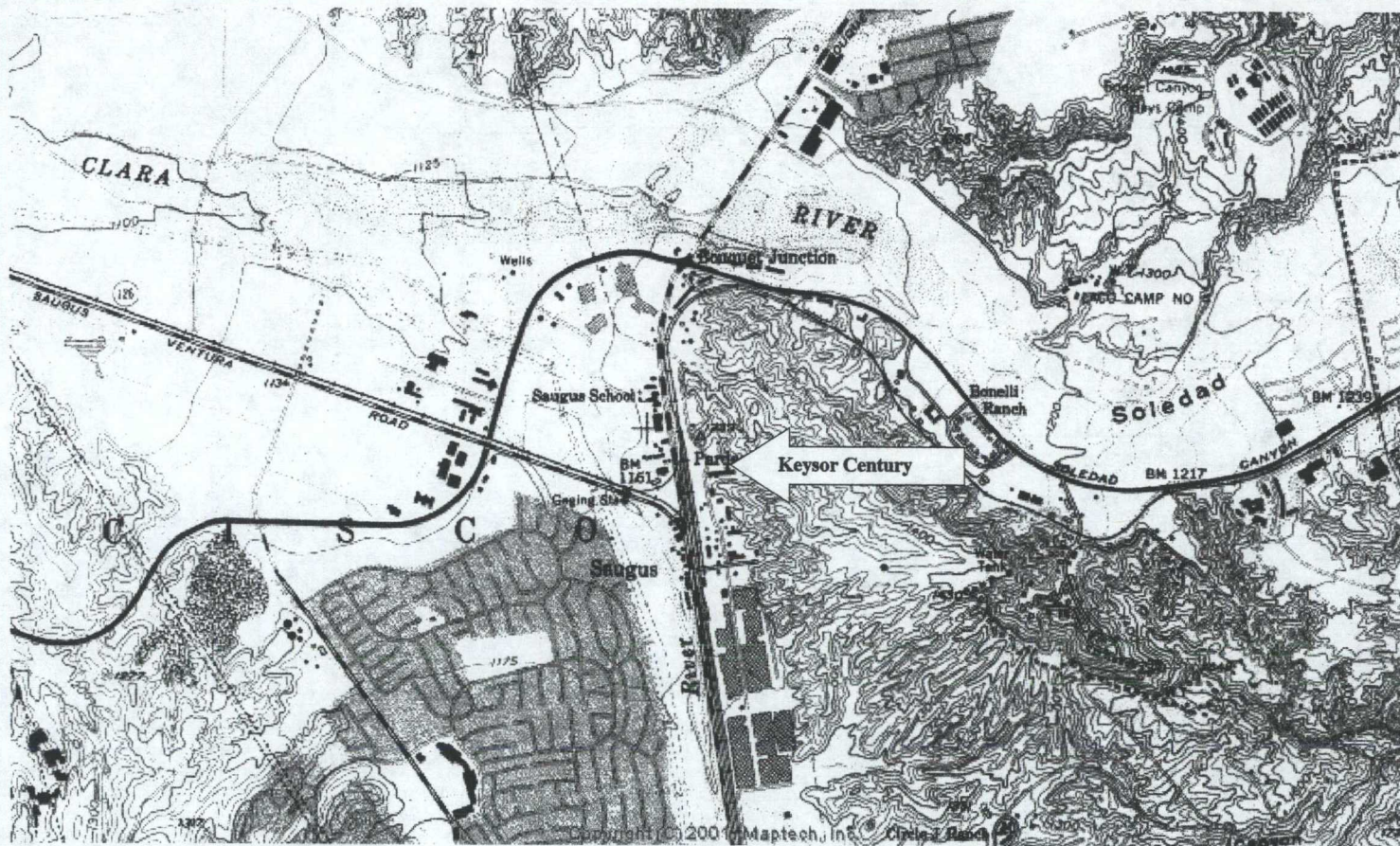
Soil and groundwater sampling in the vicinity of the site will be required to document the presence of hazardous substances in site soils, and to document an observed release to groundwater.

2.0 BACKGROUND

2.1 Location and Description

The Keysor site is approximately 32 acres and is located at 26000 Springbrook Avenue in a mixed commercial and light industrial area of Saugus in Los Angeles County, California (Latitude 35°25' 00" North, Longitude 118°32' 18" West) (Figure 2-1). The site is bound to the north and east by undeveloped land. Foothill Electric Motors, 4M Grinding, Springbrook Avenue, and Leonards Molded Products are located south of the site. The site is bound to the west by American Builders Supply; and further west by a railroad line and San Fernando Road (1, 7).

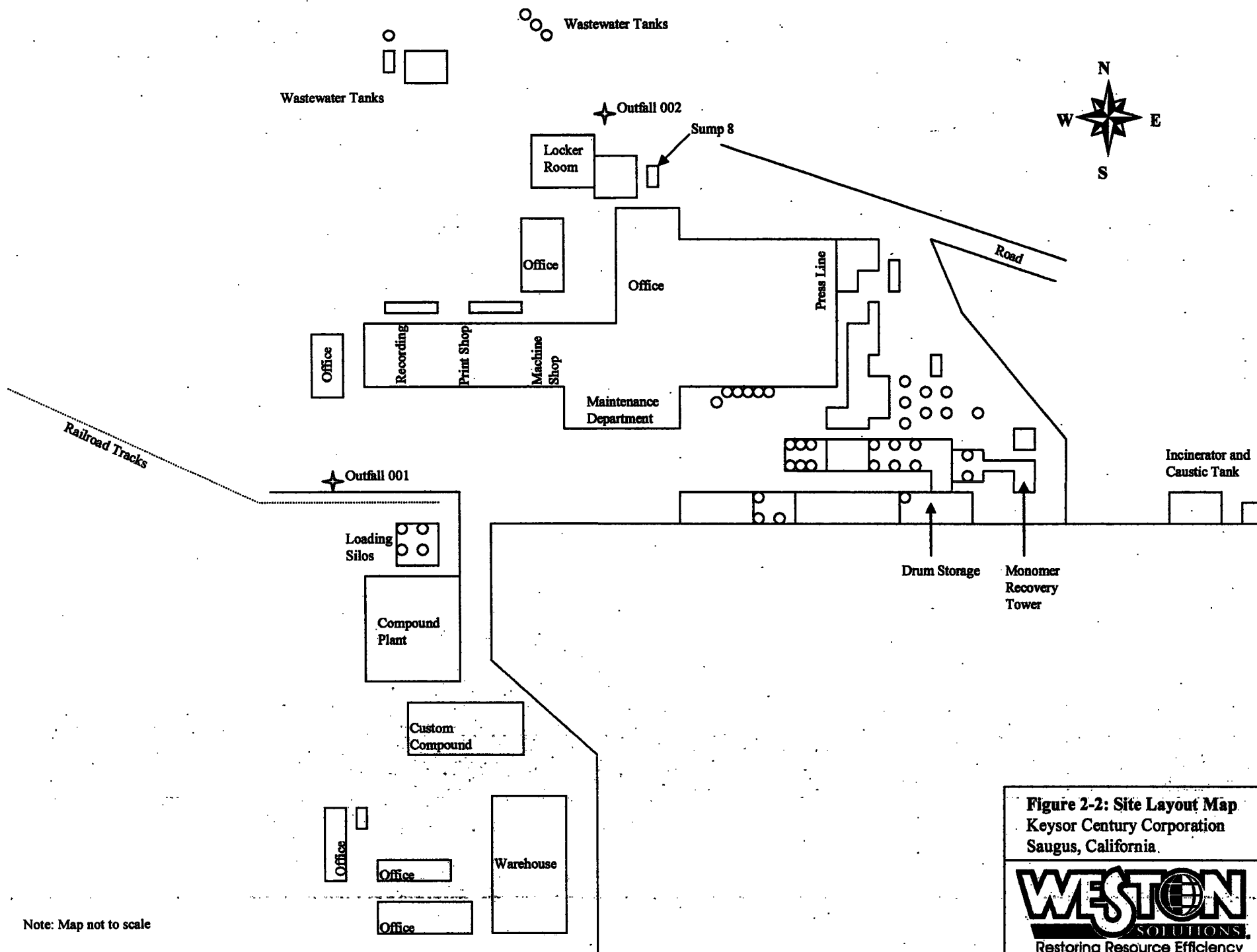
During the time of Keysor's operations, approximately 24 acres of the site consisted of undeveloped hills covered with grasses and shrubs. The remaining 8 acres included several structures and processing areas. Two main buildings existed on the Keysor site. One building included the office, main control room, and the maintenance shop; and the other building was the manufacturing plant. There were an additional five office trailers, a storage trailer, a training trailer, a warehouse, an instrument shop, and an equipment building. The resin manufacturing areas included boilers, reactors, slurry tanks, a tank farm, a cooling tower, and storage silos. Other areas included finished product silos and a truck and rail loading area. An incinerator and waste oil storage area were located east of the resin manufacturing area. The 550-Plant, located on the north side of the site, was a wastewater treatment area. Also located on site were several sumps and two outfalls (Outfall 001 and Outfall 002) that drained to the public sewer system (7, 8). A site layout map of Keysor during the time of operations is presented in Figure 2-2.



Note: Map is not to scale.
Reference: Maptech, Inc. 2001

Figure 2-1: Site Location Map
Keyzor Century Corporation
Saugus, California

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Note: Map not to scale

Figure 2-2: Site Layout Map
Keysor Century Corporation
Saugus, California.

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 Restoring Resource Efficiency

Currently, the Keysor site is undergoing demolition and reconstruction activities. As of April 2004, the incinerator and caustic tank, several sumps, the drum storage area and the monomer recovery tower have been removed (7). The current site layout is unknown at this time.

2.2 Topographic and Geologic Information

2.2.1 Regional Groundwater Conditions

The Keysor site lies within the Santa Clara River Valley Eastern groundwater basin. The water-bearing formations extend to depths of over 8,000 feet below ground surface (bgs) and comprise a reservoir tapped by municipal and industrial users. Most municipal wells draw from the alluvial aquifer within the Quarternary Alluvium, which has a maximum thickness of 200 feet. The alluvial aquifer consists primarily of interlayered beds of gravel, sand, silt, and clay (9).

The Saugus Formation directly underlies the Quarternary Alluvium. The upper portion of the Saugus Formation is up to 5,000 feet thick and consists of numerous coarse-grained sand and gravel beds that form the potential aquifer units. The lower portion of the formation is the Sunshine Ranch Member and is up to 3,500 feet thick. The Sunshine Ranch Member does not contain groundwater adequate for municipal supply due to the abundance of fine-grained sediments of low permeability causing insufficient quantities of water (9).

2.2.2 Local Hydrogeologic Setting

The Keysor site is on the edge of the groundwater basin and backs up against the bedrock of the hills. Groundwater has not been encountered at the Keysor site in past investigations. However, it is anticipated that groundwater could be as deep as 100 feet bgs. Based on the local topography shallow groundwater beneath the site is estimated to flow in a westerly direction (7).

2.3 Operational History

Since 1958, the Keysor site has been operating as a resin compound manufacturer facility, producing polyvinyl chloride resins and compounds. The polyvinyl chloride resins and compounds are produced from a polymerization reaction that uses vinyl chloride, vinyl acetate, trichloroethene (TCE), di-lauryl peroxide, and a petroleum-based defoamer as raw materials. It was reported that Keysor ceased resin manufacturing operations in December 2002. By early 2004, all operations had ceased on the Keysor site and the property was sold. The current property owner, Saugus Industrial Center, LLC, will be developing the site into an industrial park. Currently, sections of the site have been leased out for separate operations. The western portion is leased to Waste Management for storing empty refuse bins, and part of the Maintenance Department has been leased to a welder. After demolition and reconstruction activities are complete, these sections of the site will continue to be leased for the same industrial activities (1, 2, 7, 10).

2.4 Previous Investigations and Regulatory Involvement

Several preliminary assessments and inspections have been conducted on the Keysor site under EPA authority beginning in 1984. In May 1984, a preliminary assessment summary was conducted by the Department of Health Services, Toxic Substances Control Division (now known as Department of Toxic Substances Control [DTSC]) and a site inspection was recommended. On August 16, 1988, EPA listed the Keysor site as high priority. In 1989, a CERCLA Screening Site Inspection was conducted. It was determined by EPA that no sampling of the Keysor site was necessary at that time (1, 3, 11).

Since May 1998, Keysor has been a National Pollutant Discharge Elimination System (NPDES) permit holder through the Los Angeles Regional Water Quality Control Board (RWQCB). Keysor is permitted to discharge stormwater from rain runoff. Stormwater is collected in two sumps: Sump 4 and Sump 8. During rainfall, automatic valves divert stormwater collected in Sump 4 to Outfall 001 and water in Sump 8 to Outfall 002. From the outfalls the water is diverted to an unlined ditch which leads to the South Fork Santa Clara River, a tributary to the Santa Clara River. The water is not treated prior to being diverted to the ditch (7, 12, 13).

The RWQCB has conducted several inspections on the Keysor site. On August 24, 2002, an inspection revealed that there was a significant potential for impact to soil and groundwater by hazardous substances on the Keysor site. A review of self-monitoring reports revealed several violations including, but not limited to: missing monitoring data; effluent limit violation of biochemical oxygen demand (BOD₅), pH, chloride, nitrate and nitrite, and TCE; and elevated concentrations of acetone and vinyl acetate. The inspection report also indicated that the RWQCB responded to two spill incidents on the Keysor site on October 18, 2001 and October 19, 2001. On October 18, 2001, approximately 3,000 gallons of a white substance spilled and flowed into the South Fork Santa Clara River. On October 19, 2001, approximately 500 gallons of water containing a white substance was observed flowing on the west side of the site near the railroad tracks and draining into the South Fork Santa Clara River. On September 17, 2002, an inspection was performed by the RWQCB in response to several hazardous material spill incidents on the site. The RWQCB was concerned about the numerous releases on site and the potential for impacting soil and groundwater beneath the site. It was recommended that material and waste handling practices be improved (13, 14).

According to the DTSC, the Keysor site is a small quantity generator. DTSC has conducted sampling at the Keysor site, however, the results and/or reports have not yet been released to the public.

South Coast Air Quality Management District (SCAQMD) is the primary regulatory agency for air emissions. Numerous violations have been issued due to excessive emissions of vinyl chloride and nitrogen oxide, and failure to maintain equipment (15).

Los Angeles County Certified Unified Program Agency (CUPA) has conducted on-site inspections of the Keysor site and issued several notices of violation (NOVs). NOVs issued include lack of hazardous waste determination and hazardous waste labeling. In addition, numerous on-site spills have been recorded with the Los Angeles County Fire Department (LACFD) Health Hazardous Materials Division. In April 2001, LACFD collected samples from a grated drain on the Keysor property and results indicated the presence of vinyl chloride (218 micrograms per liter [$\mu\text{g/l}$]), chloromethane (1.6 $\mu\text{g/l}$), chloroethane (2.2 $\mu\text{g/l}$), 1,1-DCA (0.7 $\mu\text{g/l}$), cis-1,2-DCE (19.7 $\mu\text{g/l}$), chloroform (2.54 $\mu\text{g/l}$), TCE (170 $\mu\text{g/l}$), bromodichloromethane (3.74 $\mu\text{g/l}$), dibromochloromethane (10.7 $\mu\text{g/l}$), and bromoform (4.13 $\mu\text{g/l}$). Sampling procedures are unknown at this time (16, 17, 18).

Los Angeles County Department of Public Works (LADPW) conducted an industrial waste job order rainwater diversion system inspection in June 1999. The rainwater diversion systems tests were deemed adequate (19).

Los Angeles County Sanitation District (LACSD) has been involved with the Keysor site since the early 1960s issuing industrial wastewater discharge permits and conducting industrial wastewater sampling oversight. Industrial wastewater samples collected on site on March 3, 2003 and analyzed for VOCs and semivolatile organic compounds (SVOCs) indicated concentrations of 82.6 $\mu\text{g/l}$ vinyl chloride and 38.8 $\mu\text{g/l}$ TCE (15, 20).

Other environmental site assessments have been conducted on the Keysor site for private parties. In December 2000, a Phase I Environmental Site Assessment was conducted by Ninyo & Moore Geotechnical and Environmental Sciences Consultants. The report recommended that sub-surface soil and groundwater sampling be conducted in areas of possible vinyl chloride and TCE impact. In June 2001, another Phase I Environmental Site Assessment was conducted by EMG Corporate Center (EMG). EMG recommended a sub-surface investigation in the area of the former wastewater pond (8, 21).

In May 2001, EMG conducted a Phase II Environmental Assessment of the Keysor site. Soil samples were collected within the graded fill material at the site of the former wastewater pond. The samples were collected by advancing nine Geoprobe soil borings. Soil borings were advanced to a maximum of 15 feet bgs. The soil samples were collected near the surface and at 4-foot intervals from the soil borings. Soil samples were collected in glass jars or core liners and analyzed for VOCs using EPA Method 8260. Analytical results indicated the presence of VOCs including TCE, 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, toluene, and benzene. Maximum concentrations of each analyte detected are as follows: 15 ppb TCE; 17 ppb 1,2-DCA; 11 ppb cis-1,2-DCE; 19 ppb vinyl chloride; 130 ppb toluene; and 2 ppb acetone (22).

An Additional Phase II Environmental Assessment was performed at the Keysor site by EMG in May 2001. The assessment consisted of advancing three hollow stem auger soil borings to install

soil vapor probes in the area of the former pond and locations where detectable concentrations of VOCs were previously reported in shallow subsurface soil. Soil borings were advanced to a depth of approximately 30 feet bgs, in which soil gas probes were installed at 10, 20, and 30 feet bgs in each boring. Soil samples were collected from 10, 20, and 30 feet in each of the borings. Soil samples were collected in glass jars and analyzed for VOCs using EPA Method 8260. Analytical results of the soil samples indicated the presence of PCE, TCE, 1,2,4-trimethylbenzene (1,2,4-TMB), xylenes, m-,p-, 1,3,5-TMB, 1,2-DCA, cis-1,2-DCE, toluene, and vinyl chloride. Maximum concentrations of each analyte detected are as follows: 1 ppb PCE; 1 ppb TCE; 4 ppb 1,2,4-TMB; 2 ppb xylenes, m-,p-; 1 ppb 1,3,5-TMB; 4 ppb 1,2-DCA; 9 ppb cis-1,2-DCE; 12 ppb toluene; and 2 ppb vinyl chloride. Soil vapor samples were collected and delivered to a mobile laboratory for VOC analysis. Analytical results indicated the presence of TCE, 1,2-DCE, toluene, and vinyl chloride. Maximum concentrations of each analyte are as follows: 1.8 µg/l TCE; 3.9 µg/l 1,2-DCE; 2.4 µg/l toluene; and 1.7 µg/l vinyl chloride. Due to low concentrations of VOCs detected in soil vapor and subsurface soil samples, EMG found no evidence of a significant release and recommended that no further investigation was warranted at that time (23).

In November 2003, RAMCO Environmental, LLC (RAMCO), completed a Preliminary Site Investigation of the Keysor site. A soil vapor survey was conducted, and based on the results soil samples were collected at areas of elevated vapor concentrations. Soil vapor ports were installed at 35 locations at a depth of 18 inches bgs. Results indicated that the maximum concentrations of vapors were located in the vicinity of the tanks and reactors in the process area. Soil samples were collected from 10 locations at various depths at a maximum of 4 feet bgs. Soil borings were advanced using a hand auger and the soil samples were collected directly from the hand auger and containerized in a glass jar. Analytical results indicated the presence of toluene (430 micrograms per kilogram [µg/kg]) at one location, and TCE (15 µg/kg) at another location. RAMCO intended to sample groundwater beneath the site, however groundwater was not encountered at the two assigned locations. The two boring locations were located along the western boundary of the site. One boring was advanced to 50 feet bgs and groundwater was not encountered. However, between 25 and 40 feet bgs the soil moisture was close to saturation. The second borehole was advanced to 28 feet bgs when drilling ceased due to refusal. Groundwater was not encountered at this boring (24).

2.5 Waste Characteristics

Operations on the Keysor site included the production of polyvinyl chloride resins and compounds from 1959 until resin production reportedly ceased in December 2002. Raw materials used in the production of polyvinyl chloride resin and compounds included vinyl chloride, vinyl acetate, TCE, di-lauryl peroxide, and a petroleum based defoamer. Although past soil sampling conducted on the Keysor site indicated low concentrations of VOCs, additional sampling is warranted due to the expansiveness of the site and the numerous reported spills of processed water and wastewater in recent times. Sources of VOC contamination include, but are not limited to, the former

wastewater pond, the numerous sumps located on site that have reportedly overflowed on several occasions with wastewater, and the loading silo area.

2.6 HRS Pathways

The numerous reported spills on the Keysor site suggest that shallow groundwater, on-site soils and surface water beneath and in the vicinity of the site may be impacted by VOCs from site sources.

Groundwater in the vicinity is found in Quarternary Alluvium and the Saugus Formation. All water-bearing units are designated as aquifers by the RWQCB. Most municipal wells draw from the alluvial aquifer within the Quarternary Alluvium. There are several active municipal drinking water wells within the target distance limit of the site. However, interconnected aquifers beneath the site could cause future contamination issues in primary drinking water aquifers in the Santa Clara Valley River Eastern groundwater basin.

Stormwater runoff from the site is collected in two sumps; Sump 4 and Sump 8. During rainfall, automatic valves divert stormwater collected in Sump 4 to Outfall 001 and water in Sump 8 to Outfall 002. From the outfalls the water is diverted to an unlined ditch which leads to the South Fork Santa Clara River, a tributary to the Santa Clara River. The water is not treated prior to being diverted to the ditch. The South Fork Santa Clara River is located approximately 0.5 mile west of the site. The Santa Clara River is a critical habitat for the Unarmored Threespine Stickleback, a Federally designated endangered species.

3.0 PROJECT OBJECTIVES

3.1 Project Task and Problem Definition

WESTON has been tasked to conduct sampling to characterize groundwater, soil, and sediment in the site vicinity to further the HRS process. To establish an observed release to groundwater, five monitoring wells will be installed and groundwater samples will be collected and submitted for laboratory analysis of VOCs. To document the presence of hazardous substance sources, soil samples will be collected and submitted for laboratory analysis of VOCs. In addition, sediment from the unlined ditch located in the western portion of the Keysor site will be sampled.

3.2 Data Use Objectives

Data collected during this site investigation will be used to:

- Determine the concentrations of VOCs in site soils to document the presence of hazardous substances in the source.

- Document the concentrations of VOCs in groundwater to evaluate whether an observed release to groundwater has occurred and can be attributed to the site.
- Document the concentrations of VOCs in sediment to evaluate whether there is a potential threat to species in the Santa Clara River.
- Evaluate whether further characterization of the site is necessary. If additional characterization of the site is indicated, an addendum will be made to this SAP that documents these findings and provides a design and procedures for additional site characterization.

3.3 Action Levels

In accordance with the HRS, the action levels to establish an observed release to groundwater and to establish an on-site source are concentrations that are significantly above background concentrations. Significantly above background is defined as three times the background concentration for all media. If the background concentration is below the analytical quantitation limit, then the default action level is the sample quantitation limit. The soil background samples will be collected in areas that were not utilized by Keysor to conduct operations or for storage of hazardous materials. The Keysor site is on the edge of bedrock and the groundwater basin and therefore no groundwater is located upgradient of the site. For this investigation the background sample will be collected cross gradient of the suspected contaminated area.

All runoff from the site enters an unlined ditch along the western portion of the site. Because there are no other facilities located directly east of the Keysor site, it is assumed that all contaminants found in sediment within the ditch are attributable to the Keysor site. For this investigation the background concentrations for sediment are zero, and the action level is the sample quantitation limit.

3.4 Decision Rules

If groundwater samples collected on site are found to contain concentrations of VOCs significantly above background concentrations, then a release to groundwater will be documented and integrated into the site's HRS score. If soil samples collected around suspected areas of contamination are found to contain concentrations of VOCs significantly above background concentrations, then a hazardous substance source will be documented at the Keysor site. If sediment samples are found to contain concentrations of VOCs above the corresponding action levels, then a hazardous substance source will be documented at the Keysor site.

3.5 Data Quality Objectives

3.5.1 Data Quality Objective (DQO) Process

The DQO process, as set forth in the EPA document, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, was followed to establish the data quality objectives for this project. An outline of the process and the outputs for this project are included in Appendix B.

3.5.2 DQO Data Categories

This investigation will involve the generation of definitive data for groundwater, soil, and sediment. The specific requirements for this data category are detailed in Section 9. The data generated under this project will comply with the requirements for that data category as defined in *Data Quality Objective Process for Superfund*, EPA 540/G-93/71, September 1993. All definitive analytical methods employed for this project will be methods approved by the EPA.

3.5.3 Data Quality Indicators

Data quality indicator goals (DQIs) for this project were developed following guidelines in *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5 Final. All sampling will be guided by procedures detailed in Section 6.2 to ensure representativeness of sample results. Table 3-1 documents the DQIs for this project. As presented in this table, EPA Contract Laboratory Program (CLP) modified California Contract Required Detection Limits (CRDLs) were determined to be appropriate for this project.

3.6 Data Management

Samples will be collected and logged on a chain-of-custody form as discussed in Section 8.4. Samples will be kept secure in the custody of the sampler at all times, who will assure that all preservation parameters are being followed. Samples will be transferred to the CLP Laboratory via a certified carrier in a properly custody-sealed container with chain-of-custody documentation. The laboratory should note any evidence of tampering upon receipt.

The completed laboratory data report will be submitted to the EPA-QAO. Data validation will be conducted by the EPA-QAO, who will provide the data validation reports to the EPA-SAM. The EPA-SAM will then provide the data reports to the WESTON PM. The data validation reports and laboratory data summary sheets will be included in the final report to be submitted to the EPA-SAM. Before submittal, the final report will undergo a technical review to ensure that all data have been reported and discussed correctly.

3.7 Schedule of Sampling Activities

It is anticipated that field activities will begin the week of May 23, 2005. Field sampling is expected to last eight days. Subsequent to the field sampling event, samples will be analyzed, data will be evaluated and validated, and a final report will be prepared. The target date for completion of the final report is July 29, 2005.

3.8 Special Training Requirements/Certifications

There are no special training or certification requirements specific to this project. Training requirements relevant to WESTON's health and safety program comply with 29 CFR 1910.120. The Site-Specific Health and Safety Plan is presented in Appendix C.

**Table 3-1:
Data Quality Indicator Goals
Groundwater (µg/l), Soil (µg/kg), and Sediment (µg/kg)**

Method — Analytes ¹	Action Level ²	Modified California CRDL groundwater (µg/l)	CRDL soil and sediment (µg/kg)	Accuracy (% Recovery for MS/MSD)	Precision (RPD for MS/MSD and duplicates)	Percent Complete
CLPAS						
Vinyl acetate	3 x background	0.50	10	75-125	≤20	≥90
Vinyl chloride	3 x background	0.50	10	75-125	≤20	≥90
Trichloroethene	3 x background	0.50	10	75-125	≤20	≥90

CRDL = EPA CLPAS OLM04.2 Contract Required Detection Limits

CLPAS = EPA Contract Laboratory Program Analytical Services

MS/MSD = Matrix Spike/Matrix Spike Duplicate

RPD = Relative Percent Difference

µg/l = micrograms per liter

µg/kg = micrograms per kilogram

¹ = This table lists only the primary Analytes of Concern for the Keysor site. However, the entire CLPAS OLM04.2 target analyte list for volatiles will be reported.

² = Analytical results collected from KC-GW-5 will be used for groundwater background levels and analytical results collected from KC-SB-14 and KC-SB-15 will be used for soil background levels. The quantitation limits will be the action levels for sediment, as described in Section 3.3.

4.0 SAMPLING RATIONALE

4.1 Sampling Locations and Rationale

The objective of this investigation is to evaluate site environmental concerns and determine the extent of groundwater, soil and/or sediment contamination attributable to the Keysor site. WESTON has reviewed available site information to determine historic uses and identify hazardous substances that may be present on site.

Based on the available site history, WESTON selected a sampling strategy to evaluate site contamination. Locations where hazardous materials were used and stored historically as well as locations of reported spills are well defined in various agency files. Samples will be collected at areas of suspected contamination.

Proposed groundwater, soil, and sediment sample locations are illustrated in Figure 4-1. Exact sampling locations will be determined in the field based upon accessibility and visible signs of contamination (e.g., stained soil). Detailed rationale for the sample locations are presented in the following subsections.

4.1.1 Groundwater Sampling

To establish whether a release to groundwater has occurred, monitoring wells will be installed and groundwater samples will be collected at locations throughout the Keysor site. Because the site is situated adjacent to bedrock at the edge of the groundwater basin, no upgradient groundwater is available for sampling. In addition, no known alternate sources of hazardous substances have been identified upgradient or uphill from the site. For this investigation the background sample will be collected cross gradient of the suspected contaminated area.

The proposed monitoring well locations (KC-GW-1 through KC-GW-5) are presented in Figure 4-1. A total of five monitoring well locations were selected. KC-GW-1 is located in the Process Area and downgradient of the former unlined pond, KC-GW-2 is located downgradient of the former wastewater tank area and 550-Plant, KC-GW-3 is located downgradient of the central portion of the site, KC-GW-4 is located downgradient of the loading silos and Outfall 001, and KC-GW-5 is located cross gradient of the suspected contaminated area in the southern portion of the site. All groundwater samples will be analyzed for VOCs.

4.1.2 Soil Sampling

To establish a source of VOCs at the Keysor site, a total of 60 soil samples will be collected from 15 locations. The locations of the soil samples (KC-SB-1 through KC-SB-15) are presented in Figure 4-1. Four samples will be collected at various depths (2 feet bgs, 5 feet bgs, 10 feet bgs, and 15 feet bgs) at each sample location. Two soil sample locations will be located in areas that

were not utilized by Keysor to conduct operations or for storage of hazardous materials to determine background concentrations. The remaining soil sample locations are located in areas of suspected contamination. Three sample locations are located in the former unlined pond area, two sample locations are within the Process Area, two sample locations are located in the former 550-Plant and wastewater treatment area, two sample locations are located adjacent to the loading silos, one sample location is adjacent to Sump 10, one sample location is adjacent to Sump 8, one sample location is adjacent to Outfall 001, and one sample location is adjacent to Outfall 002. All soil samples will be analyzed for VOCs.

4.1.3 Sediment Sampling

To establish a source at the Keysor site, sediment samples will be collected from the unlined ditch that runs on the western portion of the site. The approximate locations of the sediment samples (KC-SED-1 and KC-SED-2) are presented in Figure 4-1. All sediment samples will be analyzed for VOCs.

4.2 Analytes of Concern

Constituents deemed most likely to be elevated above background levels are TCE, vinyl acetate, and vinyl chloride. Therefore, these specific VOCs are the main AOCs for this investigation. However, if any other VOCs are detected during analysis, they will be evaluated as potential AOCs by comparison with their background concentrations. AOCs are presented in Table 3-1.

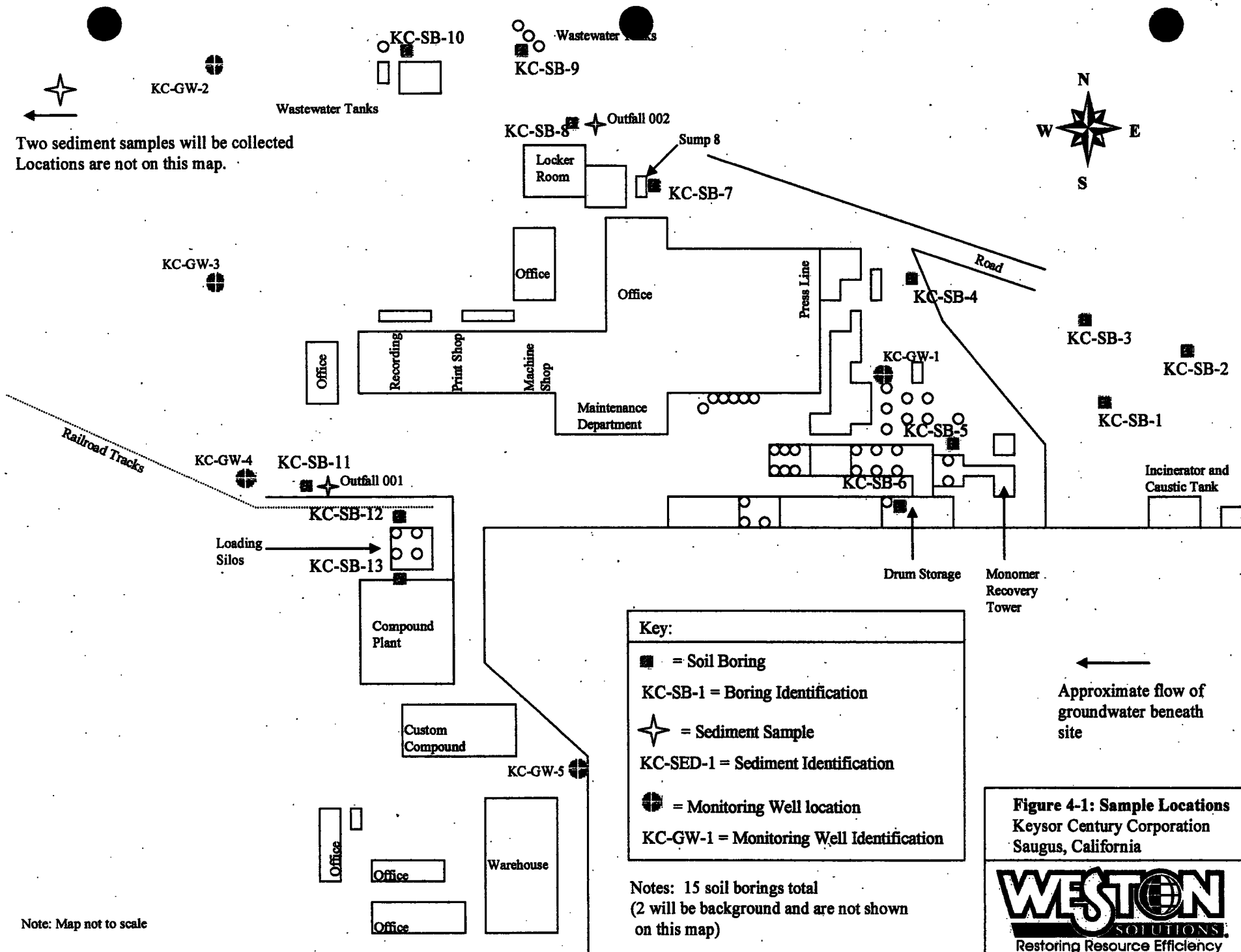


Figure 4-1: Sample Locations
Keyser Century Corporation
Saugus, California



5.0 REQUEST FOR ANALYSES

All laboratory services will be scheduled and arranged for by the USEPA Region 9 Regional Sample Control Coordinator, Mary O'Donnell. Samples will be analyzed for VOCs by a laboratory selected by Mary O'Donnell. Sample containers, preservatives, holding times, and estimated number of field and QC samples are summarized in Table 5-1, Table 5-2, and Table 5-3.

As shown in Table 5-1, groundwater samples will be collected at five locations. Additional sample volume collected at one location will be identified for use as a laboratory QC sample. One field duplicate sample will be collected for a total of 6 groundwater samples. Each groundwater sample will be analyzed for VOCs via CLP Analytical Services (CLPAS) Method OLC03.2 (or equivalent).

As shown in Table 5-2, 60 soil samples will be collected at 15 locations. Additional sample volume collected at three locations will be identified for use as laboratory QC samples. Six field duplicate samples will be collected at six separate locations for a total of 66 soil samples. Each soil sample will be analyzed for VOCs via CLPAS Method OLM04.3 (or equivalent).

As shown in Table 5-3, two sediment samples will be collected at two locations. Additional sample volume collected at one location will be identified for use as a laboratory QC sample. One field duplicate sample will be collected at one location for a total of three sediment samples. Each sediment sample will be analyzed for VOCs via CLPAS Method OLM04.3 (or equivalent).

One equipment blank will be collected per matrix for each day that equipment is decontaminated in the field. A total of up to 7 equipment blanks is expected. As shown in Table 5-1, equipment blanks will be analyzed for VOCs via CLPAS Method OLC03.2 in the same manner as the groundwater samples.

To provide analytical quality control for the analytical program, the following measures will be utilized:

- All sample analysis will be conducted by laboratories selected by the USEPA QAO.
- Additional sample volume will be collected for at least one sample per media per each analytical method, to be utilized for matrix spike/duplicate analysis.
- A CLP-type data package will be required from the laboratories for all resultant data.

**Table 5-1:
Request for Analytical Services
Matrix - Groundwater**

Table 5-1: Request for Analytical Services; Matrix - Groundwater			
Method Number & Analysis			CLPAS OLC03.2 for VOCs
Preservatives			HCl pH<2 & Chill to 4°C
Analytical Holding Time			<7 days
Sample Volume / Sample Container			3 x 40 mL glass vials
Sample Information:			
Sample #	Depth (ft bgs)	Designation	CLPAS OLC03.2 for VOCs
KC-GW-1	~60		X
KC-GW-2	~60		X
KC-GW-3	~60		X
KC-GW-4	~60	MS/MSD	X
KC-GW-5	~60	Background	X
KC-GW-6	~60	Duplicate of KC-GW-1	X
KC-GW-7	~60	Duplicate of KC-GW-3	X
KC-EB-1	N/A	Equipment Blank	X
KC-EB-2	N/A	Equipment Blank	X
KC-EB-3	N/A	Equipment Blank	X
KC-EB-4	N/A	Equipment Blank	X
KC-EB-5	N/A	Equipment Blank	X
KC-EB-6	N/A	Equipment Blank	X
KC-EB-7	N/A	Equipment Blank	X
Number of Field Samples:			5
Number of Equipment Blanks:			7
Number of Field Duplicates:			2
Number of Samples as MS/MSDs:			1
TOTAL NUMBER OF SAMPLES			14
ft bgs	feet below ground surface	Dup	Duplicate Sample
MS/MSD	Matrix Spike/ Matrix Spike Duplicate		

**Table 5-2:
Request for Analytical Services
Matrix - Soil**

Table 5-2: Request for Analytical Services; Matrix - Soil			
Method Number & Analysis			CLPAS OLM04.3 for VOCs
Preservatives			Chill to 4°C
Analytical Holding Time			<48 hours
Sample Volume / Sample Container			3 EnCore Samplers/ 4 oz glass jar*
Sample Information:			
Sample #	Depth (ft bgs)	Designation	CLPAS OLM04.3 for VOCs
KC-SB-1A	~2		X
KC-SB-1B	~5		X
KC-SB-1C	~10		X
KC-SB-1D	~15		X
KC-SB-2A	~2	MS/MSD	X
KC-SB-2B	~5		X
KC-SB-2C	~10		X
KC-SB-2D	~15		X
KC-SB-3A	~2		X
KC-SB-3B	~5		X
KC-SB-3C	~10		X
KC-SB-3D	~15		X
KC-SB-4A	~2		X
KC-SB-4B	~5		X
KC-SB-4C	~10		X
KC-SB-4D	~15		X
KC-SB-5A	~2		X
KC-SB-5B	~5		X
KC-SB-5C	~10		X

Sample #	Depth (ft bgs)	Designation	CLPAS OLM04.3 for VOCs
KC-SB-5D	~15		X
KC-SB-6A	~2		X
KC-SB-6B	~5		X
KC-SB-6C	~10		X
KC-SB-6D	~15		X
KC-SB-7A	~2		X
KC-SB-7B	~5		X
KC-SB-7C	~10		X
KC-SB-7D	~15		X
KC-SB-8A	~2		X
KC-SB-8B	~5	MS/MSD	X
KC-SB-8C	~10		X
KC-SB-8D	~15		X
KC-SB-9A	~2		X
KC-SB-9B	~5		X
KC-SB-9C	~10		X
KC-SB-9D	~15		X
KC-SB-10A	~2		X
KC-SB-10B	~5		X
KC-SB-10C	~10		X
KC-SB-10D	~15		X
KC-SB-11A	~2		X
KC-SB-11B	~5		X
KC-SB-11C	~10		X
KC-SB-11D	~15		X
KC-SB-12A	~2		X
KC-SB-12B	~5		X

Sample #	Depth (ft bgs)	Designation	CLPAS OLM04.3 for VOCs
KC-SB-12C	~10	MS/MSD	X
KC-SB-12D	~15		X
KC-SB-13A	~2		X
KC-SB-13B	~5		X
KC-SB-13C	~10		X
KC-SB-13D	~15		X
KC-SB-14A	~2	Background	X
KC-SB-14B	~5	Background	X
KC-SB-14C	~10	Background	X
KC-SB-14D	~15	Background	X
KC-SB-15A	~2	Background	X
KC-SB-15B	~5	Background	X
KC-SB-15C	~10	Background	X
KC-SB-15D	~15	Background	X
KC-SB-16	~2	Duplicate of KC-SB-1A	X
KC-SB-17	~2	Duplicate of KC-SB-7A	X
KC-SB-18	~5	Duplicate of KC-SB-3B	X
KC-SB-19	~5	Duplicate of KC-SB-5B	X
KC-SB-20	~10	Duplicate of KC-SB-9C	X
KC-SB-21	~15	Duplicate of KC-SB-11D	X
Number of Field Samples:			60
Number of Field Duplicates:			6
Number of Samples as MS/MSDs:			3
TOTAL NUMBER OF SAMPLES			66
ft bgs	feet below ground surface		* = Additional 4 oz jar is for associated moisture sample
MS/MSD	Matrix Spike/ Matrix Spike Duplicate		
Dup	Duplicate Sample		

**Table 5-3:
Request for Analytical Services
Matrix - Sediment**

Table 5-3: Request for Analytical Services; Matrix - Sediment			
Method Number & Analysis			CLPAS OLM04.3 for VOCs
Preservatives			Chill to 4°C
Analytical Holding Time			<48 hours
Sample Volume / Sample Container			3 EnCore Samplers/ 4 oz glass jar*
Sample #	Depth (ft bgs)	Designation	CLPAS OLM04.3 for VOCs
KC-SED-1	~2		X
KC-SED-2	~2	MS/MSD	X
KC-SED-3	~2	Duplicate of KC-SED-1	X
Number of Field Samples:			2
Number of Field Duplicates:			1
Number of Samples as MS/MSDs:			1
TOTAL NUMBER OF SAMPLES			3
ft bgs	feet below ground surface	Dup	Duplicate Sample
MS/MSD	Matrix Spike/ Matrix Spike Duplicate		

6.0 METHODS AND PROCEDURES

6.1 Field Equipment

6.1.1 Sampling Equipment

The following equipment will be used to obtain environmental samples:

Equipment	Fabrication	Dedicated
Air Rotary Drill Stem	Hardened Steel	No
Swabber	Hardened Steel	No
HSA Flights	Hardened Steel	No
Split-spoon Soil Sampler	Hardened Steel	No
Sampler Sleeves	Acetate	Yes
Trowels	Plastic	Yes
Bailer	Polyethylene	Yes
Submersible Pump	Stainless Steel	No
Surge Block	Hardened Steel	No
Water Level Tape	Plastic/Stainless Steel	No
Tubing	Teflon	Yes
Hand Auger	Stainless Steel	No
Encore Sampler	Teflon	Yes
Zip-lock bags	Plastic	Yes
Gloves	Nitrile	Yes

The drilling equipment and sampling devices will be operated by a subcontractor using standard industry practices. Equipment maintenance will be the responsibility of the subcontracted drilling company.

6.1.2 Inspection/Acceptance Requirements for Supplies and Consumables

There are no project-specific inspection/acceptance criteria for supplies and consumables. It is standard operating procedure that personnel will not use broken or defective materials; items will not be used past their expiration date; supplies and consumables will be checked against order and packing slips to verify the correct items were received; and the supplier will be notified of any missing or damaged items.

6.1.3 Field Notes

6.1.3.1 Logbooks

Field logbooks will document where, when, how, and from whom any vital project information was obtained. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. The logbook is bound with consecutively numbered pages. Each page will be dated and the time of entry noted in military time. All entries will be legible, written in ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions. At a minimum, the following information will be recorded, if applicable, during the collection of each sample:

- Sample location and description
- Sampler's name(s)
- Date and time of sample collection
- Type of sample (e.g., groundwater)
- Type of sampling equipment used
- Field instrument readings and calibration readings for any equipment used, and equipment model(s) and serial number(s)
- Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, colors, etc.)
- Sample preservation
- Lot numbers of the sample containers, sample identification numbers and any explanatory codes, and chain-of-custody form numbers
- Shipping arrangements (overnight air bill number)
- Name(s) of recipient laboratory(ies)

In addition to sampling information, the following specifics may also be recorded in the field logbook for each day of sampling:

- Team members and their responsibilities
- Time of arrival on site and time of site departure
- Other personnel on site

- Summary of any meetings or discussions with any potentially responsible parties, or representatives of any federal, state, or other regulatory agency
- Deviations from sampling plans or site safety plan procedures
- Changes in personnel and responsibilities, as well as reasons for the change
- Levels of safety protection
- Record of photographs

6.1.3.2 Photographs

Photographs will be taken at representative sampling locations and at other areas of interest on site. They will verify information entered in the field logbook. When a photograph is taken, the following information will be written on the logbook or will be recorded in a separate field photography log:

- Time, date, location, and weather conditions
- Description of the subject photographed
- Name of person taking the photograph

6.1.4 Field Measurements

6.1.4.1 Underground Utilities Clearance

All underground utilities will be located and identified by a geophysical survey team. If any subsurface utilities are suspected beneath proposed borings, the borings will be relocated in order to avoid the utilities. Underground Services Alert will be notified at least 72 hours before drilling commences. In addition, the drilling subcontractor will be required to hand-auger the first five feet of each borehole.

6.2 Sampling Procedures

6.2.1 Groundwater Well Installation

6.2.1.1 Drilling Method

The monitoring well borings will be drilled to a maximum of 100 feet bgs using an air rotary with casing hammer (ARCH) drill rig. This method utilizes an outer casing that seals the borehole and prevents cross-contamination during drilling. The boreholes will be drilled with a minimum 10-inch diameter. A 20-foot screened interval, extending 10 feet above the water table and 10 feet below, is proposed to allow for seasonal fluctuations in water level. Actual placement depths will be determined in the field by the depth of first encountered groundwater.

6.2.1.2 Well Construction

The proposed monitoring well construction diagram is presented in Figure 6-1. The wells will be constructed of 4-inch diameter, Schedule 40 polyvinyl chloride (PVC) casing and screen. The screen will consist of factory-manufactured slots with an anticipated opening of 0.02-inch (20 slot). The actual slot size will depend on the characteristics of the formation.

All casing and screen sections will be coupled with flush-threaded joints and Viton O-rings. No petroleum-base lubricants, glues, or epoxies will be used to join sections of casing or pipe. Centralizers will be placed at the bottom and top of the screen section and every 30 feet along the length of blank casing.

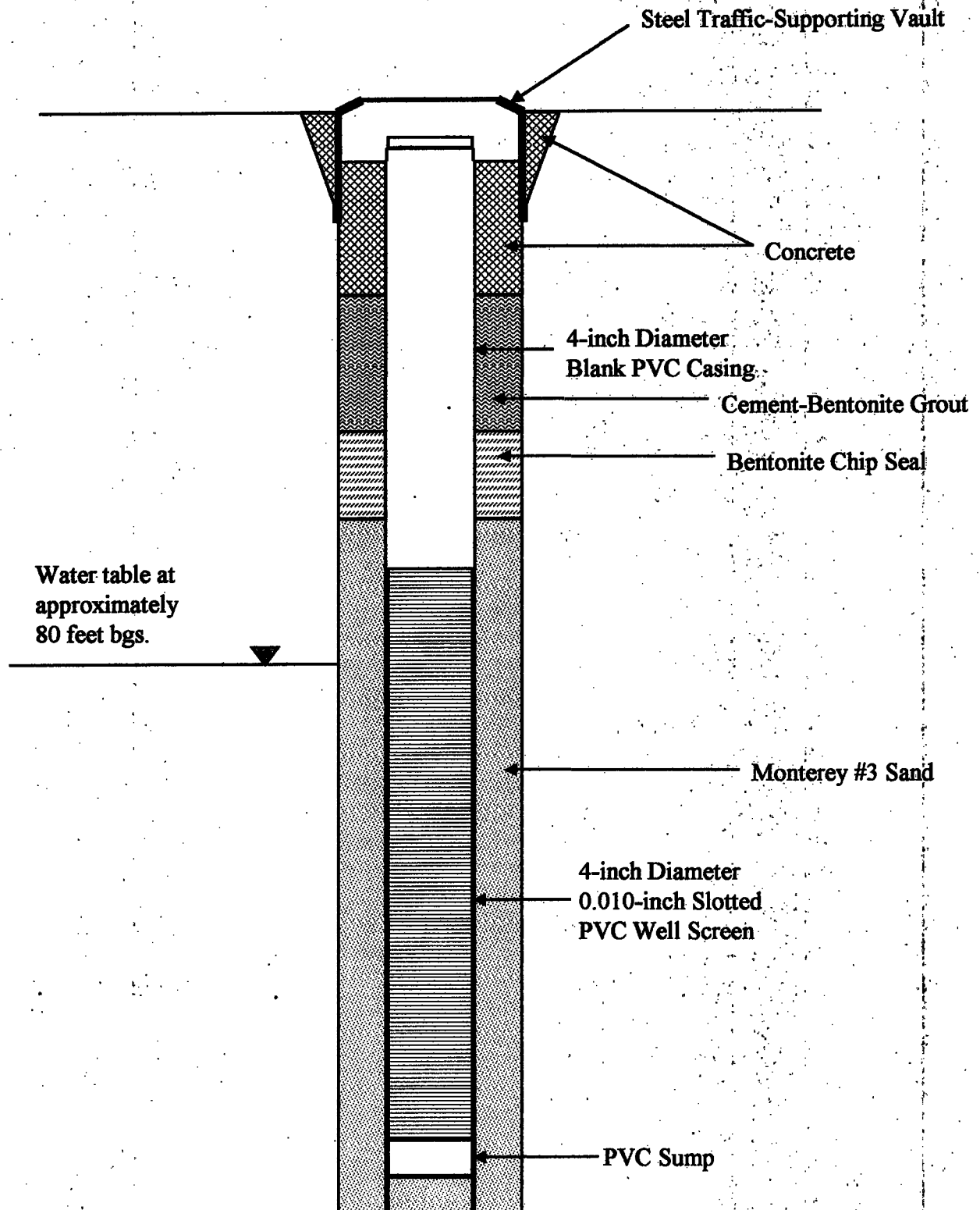
The annulus around the screened section of the wells will be filled with a washed silica filter material appropriate to the formation lithology and well screen size. It is anticipated that Monterey #3 sand will be appropriate, although the type of sand used will depend on actual site conditions. The filter pack will be placed using a tremie pipe, and will rise 5 feet above the top of the screen. While placing the filter pack, the level of material in the annulus will be monitored with a weighted tape to assure that bridging is not occurring. After the filter pack is in place, it will be settled by reciprocating a swabbing tool within the well screen. The settled height will be remeasured after swabbing and more filter pack material will be added if necessary.

A 5-foot thick bentonite pellet seal will be placed above the filter pack. The annulus above the seal will be filled with a cement/bentonite grout containing 6.5 gallons of water and 4 pounds of powdered bentonite for each 96-pound bag of cement. The constituents will be combined in a grout mixer and pumped down the annulus, using a tremie pipe as needed, and allowed to harden for a minimum of 24 hours prior to well development.

To reduce collapsing of the boreholes during installation, the drill casing will be withdrawn from the boreholes as the various packings are placed around the well casing. Sealing materials will be placed in a continuous motion from the bottom up. The volume of filter pack and sealants needed to fill the annular space will be calculated by WESTON prior to placement. Any discrepancies between this calculated volume and the actual amount used will be noted and reconciled to ensure the integrity of the filter and the seals.

The PVC well casing will be cut off approximately at the ground surface level with a PVC cutter and equipped with a locking, water-tight end plug. After allowing the grout to cure for at least 12 hours, an outer surface casing will be installed and equipped with a steel lid that locks with a padlock. A concrete pad with a minimum 8-inch thickness will be installed around the wellhead. The pad will be a maximum of 4-feet by 4-feet, reinforced with wire mesh or rebar, and slope away from the wellhead.

Figure 6-1
Cross Section of Suggested
Monitoring Well Construction



6.2.1.3 Well Development

A minimum of 24 hours after completion, the wells will be developed by swabbing/surging and pumping with a submersible pump until the discharge water is free of sand, and water temperature, conductivity, and pH have stabilized.

6.2.2 Groundwater Well Sampling

6.2.2.1 Water-Level Measurements

Field meter probes will be decontaminated before and after use at each well. All wells will be sounded for depth to water from top of casing prior to purging. An electronic sounder, accurate to the nearest ± 0.01 feet, will be used to measure depth to water in each well. When using an electronic sounder, the probe is lowered down the casing to the top of the water column, the graduated markings on the probe tape are used to measure the depth to water from the surveyed point on the rim of the well casing. Typically, the measuring device emits a constant tone when the probe is submerged in standing water and most electronic water level sounders have a visual indicator consisting of a small light bulb or diode that turns on when the probe encounters water. Water-level sounding equipment will be decontaminated before and after use in each well. Water levels will be measured in wells that have the least amount of known or suspected contamination first. Wells with known or suspected contamination will be measured last.

6.2.2.2 Purging

All wells will be purged prior to sampling. A minimum of three casing volumes of water will be purged using a submersible pump with dedicated, flexible Teflon tubes. The pump will be decontaminated before use in each well. The pump will be placed 2 to 3 feet from the bottom of the well to permit reasonable draw down while preventing cascading conditions.

Water will be collected into a measured bucket to record the purge volume. Casing volumes will be calculated based on total well depth, standing water level, and casing diameter. One casing volume will be calculated as:

$$V = \pi d^2 h / 77.01$$

where: V is the volume of one well casing of water (1 ft³ = 7.48 gallons);
 d is the inner diameter of the well casing (in inches);
 h is the total depth of water in the well (in feet).

It is most important to obtain a representative sample from the well. Stable water quality parameter (temperature, pH, and specific conductance) measurements indicate representative sampling is obtainable. Water quality is considered stable if for three consecutive readings:

- temperature range is no more than $\pm 1^{\circ}\text{C}$;
- pH varies by no more than 0.2 pH units;
- specific conductance readings are within 10% of the average.

Water in which measurements were taken will not be used to fill sample bottles.

Water quality measurements will be taken before the start of purging, in the middle of purging, and at the end of purging each casing volume. If water quality parameters are not stable after 5 casing volumes, purging will cease and groundwater samples will be collected. Depth to water, water quality measurements, and purge volumes will be entered in the logbook. Sampling will proceed from upgradient wells to downgradient wells and all equipment will be decontaminated between each well.

If a well dewatered before three casing volumes have been purged, that well will be allowed to recharge up to 80 percent of the static water column and dewatered once more. After water levels have again recharged to 80 percent of the static water column, groundwater samples will be collected.

6.2.2.3 Well Sampling

Groundwater samples will be collected from 5 on-site monitoring wells. Groundwater samples will be decanted directly from the bailer into the sample containers with preservative, chilled on ice, and processed for shipment to the laboratory. When transferring samples, care will be taken not to touch the bailer on the sample container. Groundwater samples will be collected by pouring the sample directly into 40-milliliter vials pre-preserved with hydrochloric acid (HCl). The vials will be immediately capped and inverted to check for air bubbles to ensure zero head space. If a bubble appears, the vial will be discarded and a new sample will be collected. For duplicate samples, bottles with the two different sample designations will be filled in an alternating sequence.

6.2.3 Soil Sampling

Soil samples will be collected from 15 on-site locations. The soil samples will be collected from the appropriate depths with either a combination direct push drill rig and hollow stem auger (HSA) rig or a hand auger. The direct push is the preferred method of collecting soil samples because no soil cuttings will be produced. However, if refusal is encountered due to cobbles and/or heavy sands, the HSA will be used.

Subsurface soil samples will be collected by boring to the desired sample depth using the hand auger or direct push method/HSA. Samples will be collected directly from the associated sleeve; either the hand auger's acetate sleeve or the drill rig's acrylic liner. Each sample will be collected by advancing the Encore into an undisturbed portion of the soil sample using a "T" bar until the

sample bar indicator is completely invisible. The sealer caps will be locked onto the Encore sampler before the subsequent aliquot is collected. Remaining soil will be placed in a 4-ounce glass jar for moisture analysis. Finally, all three Encore samplers will be placed into a single Encore bag with instructions, placed in a dedicated zip-lock bag, chilled to 4 degrees Celsius, and processed for shipment to the laboratory.

Borings will be backfilled with either hydrated medium bentonite chips or with a cement-bentonite mixture. If applicable, auger cuttings will be placed into a drum which will be labeled as to its contents (e.g., "Soil Cuttings, Borings KC-SB-1 through KC-SB-3) and dated and staged at the site pending characterization for disposal.

6.2.4 Sediment Sampling

Sediment samples will be collected from two locations within the unlined ditch on the Keysor site. Care will be taken to obtain as representative a sample as possible. The sample will be taken from areas likely to collect fine-grained sediment deposits, such as inner portions of curves in the ditch where water tends to move more slowly.

Sediment samples will be collected either by dedicated plastic hand trowels or gloved hand, and will be transferred directly to an 8-ounce wide-mouth glass jar. Sample containers will be filled to the top, taking care to prevent sediments from remaining in the lid threads prior to being closed to prevent potential contaminate migration to or from the sample. After sample containers are filled, they will be immediately sealed and processed for shipment to the laboratory.

6.3 Decontamination Procedures

The decontamination procedures that will be followed are in accordance with approved procedures. Decontamination of sampling equipment must be conducted consistently to assure the quality of samples collected. All non-dedicated equipment that comes into contact with potentially contaminated water, soil, and/or sediment will be decontaminated. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal. Decontamination will occur prior to and after each use of a piece of non-dedicated equipment. Non-dedicated equipment requiring decontamination includes the following: drilling equipment, water level tape, surge block, and submersible pump. All non-dedicated sampling devices used will be steam-cleaned or decontaminated according to EPA Region 9 recommended procedures.

The following, to be carried out in sequence, is an EPA Region 9 recommended procedure for the decontamination of sampling equipment

- Non-phosphate detergent and tap water wash, using a brush if necessary
- Tap-water rinse

- Deionized/distilled water rinse
- Isopropanol or Methanol rinse
- Deionized/distilled water rinse (twice)

Equipment will be decontaminated in a predesignated area on pallets or plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

7.0 DISPOSAL OF INVESTIGATION-DERIVED WASTE

In the process of collecting environmental samples at the Keysor site, several different types of potentially contaminated investigation-derived wastes (IDW) will be generated, including the following:

- Used personal protective equipment (PPE);
- Disposable sampling equipment;
- Decontamination fluids; and
- Excess soil, including cuttings from soil borings.

The EPA's National Contingency Plan (NCP) requires that management of IDW generated during sampling comply with all relevant and appropriate requirements to the extent practicable. This sampling plan will follow the *Office of Emergency and Remedial Response (OERR) Directive 9345.3-02* (May 1991) which provides the guidance for management of IDW. In addition, other legal and practical considerations that may affect the handling of IDW will be considered. Listed below are the procedures that will be followed for handling IDW. The procedures are flexible enough to allow the sampling team to use its professional judgement on the proper method for the disposal of each type of IDW generated at each sampling location.

- Used PPE and disposable sampling equipment will be double-bagged in plastic trash bags and disposed of in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE or dedicated equipment that is to be disposed of that can still be reused will be rendered inoperable before disposal.
- Decontamination fluids that will be generated in the sampling event will consist of dilute isopropanol/methanol, deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the site or sampling area. The decontamination fluids will be discharged to the ground.

- Soil cuttings generated during the subsurface sampling will be drummed and disposed of in an appropriate manner, pending VOC analysis.

8.0 SAMPLE IDENTIFICATION, DOCUMENTATION AND SHIPMENT

8.1 Sample Nomenclature

As shown in Table 5-1, Table 5-2, and Table 5-3 a unique, identifiable name will be assigned to each sample. The prefix "KC" will be used to identify the Keysor Century site. The middle notation will identify the matrix of the sample. The suffix will indicate the borehole number or location number specific to that matrix. If the matrix is soil, an "A" following the sample location number will represent the shallowest sample depth, "B", "C", and "D" will designate the increasingly deeper samples, with "D" being the deepest. For example, the name KC-SB-8A signifies the sample was collected from Borehole 8, the sample matrix is soil, and the sample was collected at 2 feet bgs. Groundwater and sediment samples will be identified the same way, with the exception that the suffix GW and SED, respectively, will be substituted for the soil/sample depth notation (i.e., KC-GW-1 indicates a groundwater sample). Duplicate and blank samples will be assigned fictitious names. The EPA Regional Sample Control Center Coordinator may assign additional sample numbers.

8.2 Container, Preservation, and Holding Time Requirements

All sample containers used will have been delivered to WESTON in a pre-cleaned condition with preservatives already added, where applicable. Container, preservation, and technical holding time requirements are summarized in Table 5-1, Table 5-2, and Table 5-3.

8.3 Sample Labeling, Packaging and Shipping

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. Sample labels will be created using the Forms II Lite data management system. Sample labels will be affixed to the sample containers and secured with clear tape. Samples will have preassigned, identifiable, and unique numbers in accordance with Section 8.1. The sample labels will contain the following information where appropriate:

- Sample number
- Sample location
- Date and time of collection
- Site name
- Analytical parameter and method of preservation
- CLP Case Number (if applicable)

Samples will be stored on ice in a secure location pending shipment to the contract laboratory. Sample coolers will be retained in the custody of site personnel at all times or secured so as to deny access to anyone else. The procedures for shipping samples are as follows:

- Ice will be packed in double zip-locked plastic bags.
- The drain plug of the cooler will be taped shut to prevent leakage.
- The bottom of the cooler will be lined with bubble wrap to prevent breakage during shipment.
- Screw caps will be checked for tightness.
- Containers will have custody seals affixed so as to prevent opening of the container without breaking the seal.
- All glass sample containers will be wrapped in bubble wrap.
- All containers will be sealed in zip-lock plastic bags.

All samples will be placed in coolers with the appropriate chain-of-custody forms. All forms will be enclosed in plastic bags and affixed to the underside of the cooler lid. Bags of ice will be placed on top of and around samples. Empty space in the cooler will be filled with bubble wrap or styrofoam peanuts to prevent movement and breakage during shipment. Absorbent material will also be placed in the cooler to absorb spills that occur. Each ice chest will be securely taped shut with strapping tape, and custody seals will be affixed to the front, right, and back of each cooler.

Samples will be shipped for immediate delivery to the contracted laboratory. The QAO's Region 9 Sample Control Center Coordinator (Mary O'Donnell, 510-412-2389) will be notified daily of the sample shipment schedule and will be provided with the following information:

- Sampling contractor's name
- The name of the site
- Case number
- Shipment date and expected delivery date
- Total number of samples by matrix, and relative level of contamination (i.e., low, medium, or high)
- Carrier, air bill number(s), and method of shipment (e.g., FedEx)
- Irregularities or anticipated problems associated with the samples
- Whether additional samples will be sent or if this is the last shipment

8.4 Chain of Custody Forms and QA/QC Summary Forms

A chain of custody form will be maintained for all samples to be submitted for analysis, from the time the sample is collected until its final deposition. Every transfer of custody must be noted and signed for; a copy of this record is kept by each individual who has signed. Corrections on sample paperwork will be made by drawing a single line through the mistake and initialing and dating the

change. The correct information will be entered above, below, or after the mistake. When samples are not under the direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. The chain of custody must include the following:

- Sample identification numbers
- Site name
- Sample date
- Number and volume of sample containers
- Required analyses
- Signature and name of samplers
- Signature(s) of any individual(s) with control over samples
- Airbill number
- Note(s) indicating special holding times and/or detection limits

Traffic reports will be used to document sample collection and shipment to the laboratory for analysis. The Forms II Lite data management system will be used to generate all traffic reports and chains of custody. One copy will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, only one form will be completed. If all sample information cannot be entered in one form, then multiple forms will be used. One copy of the form will be sent to the EPA QAO, another copy will be sent to Contract Laboratory Analytical Services Support, and one copy will accompany the samples to the laboratory. A photocopy of the original will be made for WESTON's master file. The document titled "*Instructions for Sample Shipping and Documentation*," Quality Assurance Management Section, USEPA Region IX, November 1997, will be taken to the field as a reference. This document is included in Appendix D.

A QA/QC summary form will be completed for each laboratory and each matrix of the sampling event. The sample number for all blanks, reference samples, laboratory QC samples (matrix spike/matrix spike duplicate [MS/MSD]) and duplicates will be documented on this form. This form is not sent to the laboratory. The original form will be sent to the EPA QAO; a photocopy of the original will be made for WESTON's master file.

9.0 QUALITY ASSURANCE AND CONTROL (QA/QC)

9.1 Field Quality Control Samples

The QA/QC samples described in the following subsections, which are also listed in Table 5-1, Table 5-2, and Table 5-3 will be collected during this investigation.

9.1.1 Assessment of Field Contamination (Blanks)

9.1.1.1 Equipment Blanks

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring distilled water over the decontaminated sampling equipment. Only non-dedicated sampling devices that actually come into contact with sample material will require an equipment blank. One equipment rinsate blank will be collected per matrix each day that sampling equipment is decontaminated in the field. Equipment rinsate blanks will be obtained by passing water through or over the decontaminated sampling devices used that day. The rinsate blanks that are collected will be analyzed for VOCs via CLPAS OLC03.2 as indicated in Table 5-1.

The equipment blanks will be preserved, packaged, and sealed in the manner described for the groundwater samples in Section 6.2. A separate sample number will be assigned to each sample and it will be submitted blind to the laboratory.

9.1.1.2 Temperature Blanks

For each cooler that is shipped or transported to an analytical laboratory, a 40-milliliter vial, or equivalent, of deionized water will be included that is marked "temperature blank." This blank will be used by the sample custodian to check the temperature of samples upon receipt.

9.1.2 Assessment of Sample Variability (Field Duplicate or Co-located Samples)

A duplicate groundwater sample will be collected at the one sample location indicated in Table 5-1. This location has been selected because it is downgradient of suspected areas of contamination and may have detectable concentrations of AOCs.

When collecting duplicate water samples, bottles with the two different sample identification numbers will be alternated in the filling sequence.

Duplicate samples will be preserved, packaged, and sealed in the same manner described for the groundwater samples in Section 6.2. A separate sample number will be assigned to each duplicate, and it will be submitted blind to the laboratory.

Duplicate soil samples will be collected at six sample locations indicated in Table 5-2. These locations have been selected because they are in suspected areas of contamination and may have detectable concentrations of AOCs.

A duplicate sediment sample will be collected at the one sample location indicated in Table 5-3. This location has been selected because it is in a suspected area of contamination and may have detected concentrations of AOCs.

Soil and sediment samples for VOC analysis will not be homogenized. Equivalent EnCore samples will be collected from the sample sleeve immediately after the collection of the original samples. Duplicate samples will be preserved, packaged, and sealed in the same manner described for the soil samples in Section 6.2. A separate sample number will be assigned to each duplicate, and it will be submitted blind to the laboratory.

9.2 Background Samples

The Keysor site is on the edge of bedrock and the groundwater basin and therefore no groundwater is located upgradient of the site. For this investigation the background sample will be collected cross gradient of the suspected contaminated area. Background soil samples will be collected in areas that were not utilized by Keysor to conduct operations or for storage of hazardous materials to differentiate between on-site and off-site contributions to contamination. Background samples indicated in Table 5-1 and Table 5-2 will be collected from the locations illustrated in Figure 4-1. The background samples will be submitted blind to the laboratory for VOCs via CLPAS OLC03.2 for groundwater and via CLPAS OLM04.2 for soil. Background samples for sediment will not be collected, as explained in Section 3.3.

9.3 Laboratory Quality Control Samples

A laboratory QC sample, called an MS/MSD for organic analysis, is not an extra sample; rather, it is a sample that requires additional QC analyses.

For groundwater samples, a double-volume groundwater sample will be collected at one assigned location to ensure that sufficient volume is collected for both routine sample analysis and additional laboratory QC analysis. Two sets of water sample containers are filled and all containers are labeled with a single sample number.

Soil and sediment samples for laboratory QC purposes will be obtained by collecting two additional co-located EnCore samples in the same way as the original samples. The additional EnCore samples will be assigned the same sample number as the original sample.

For this sampling event, the samples collected at the location indicated in Table 5-1, Table 5-2, and Table 5-3 will be the designated laboratory QC samples. These locations were chosen because they are suspected to contain detectable levels of AOCs. The sample labels and chain-of-custody records for these samples will identify them as a laboratory QC samples. At a minimum, one sample per 20 samples, per matrix, will be designated as a laboratory QC sample.

9.4 Analytical and Data Package Requirements

It is required that all samples be analyzed in accordance with CLPAS OLC03.2 and CLPAS OLM04.2 as listed in Table 5-1, Table 5-2, and Table 5-3. The laboratory is required to supply documentation to demonstrate that their data meet the requirements specified in the method.

The data validation package shall include all original documentation generated in support of this project. In addition, the laboratory will provide original documentation to support that all requirements of the method have been met. This includes, but is not limited to, sample tags, custody records, shipping information, sample preparation/extraction records, and instrument printouts such as mass spectra. Copies of information and documentation required in this document are acceptable. The following deliverables are required. Note that the following data requirements are included to specify and emphasize general documentation requirements and are not intended to supersede or change requirements of the specific method.

- Copy of the chain of custody, sample log-in records, and a Case Narrative describing the analyses and methods used and discussing the presence of any interferences, the criteria used to identify tentatively identified compounds (TICs), and the failure of the lab to meet any of the requirements or re-analyses.
- Analytical data (results) up to 3 significant figures for all samples, method blanks, MS/MSD, Laboratory Control Samples (LCS), duplicates, and field QC samples.
- QC summary sheets: EPA CLP forms that summarize the following
 1. MS/MSD/LCS recovery summary
 2. Method/preparation blank summary
 3. Initial and continuing calibration summary (including retention time windows)
 4. Sample holding time and analytical sequence (i.e., extraction and analysis)
 5. Calibration curves and correlation coefficients
 6. Duplicate summary
 7. Detection limit information
- Analyst bench records describing dilution, weighing of samples, percent moisture (solids), sample size, sample extraction and cleanup, final extract volumes and amount injected.
- Detailed explanation of the Quantitation and identification procedure used for specific analyses, giving examples of calculations from the raw data.
- The final deliverable report will consist of sequentially numbered pages.
- Internal/surrogate recoveries
- Gas Chromatograph/Mass Spectrometer tuning conditions.
- Reconstructed ion current chromatogram and Quantitation reports for all sample standards, blanks, MS/MSD, and performance evaluation samples.
- For every compound identified and each field sample, provide raw versus enhanced spectra and enhanced versus reference spectra.

- For target analytes, the reference spectrum shall be the check standard for that sample. For TICs, the reference mass spectrum shall be the best fit spectrum from a search of the spectral library.
- Confirmation analysis data - second column confirmation required for all TICs. Provide all associated raw data and summary sheets for the confirmation analyses.

9.5 Data Validation

Data validation of analytical data generated by the CLP will be performed by the EPA in accordance with the *EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*. Tier 3 traditional full validation for 100 percent of the data will be required.

To meet requirements for categorization as definitive data, the following criteria must be evaluated:

- Holding times
- Sampling design approach
- Blank combination
- Initial and continuing calibration
- Detection limits
- Analyte identification and Quantitation
- Matrix spike recoveries
- Performance evaluation samples when specified
- Analytical and total error determination
- Laboratory Control Samples

Upon completion of validation, data will be classified as one of the following: acceptable for use without qualifications, acceptable for use with qualifications, or unacceptable for use.

9.6 Field Variances

As conditions in the field may vary, it may become necessary to implement minor modifications to this plan. When appropriate, the EPA QAO will be notified of the modifications and a verbal approval will be obtained before implementing the modifications. Modifications to the original plan will be documented in the final report.

9.7 Assessment of Project Activities

9.7.1 WESTON Assessment Activities

The following assessment activities will be performed by WESTON:

- All project deliverables (SAP, Data Summaries, Data Validation Reports, Investigation Report) will be peer reviewed prior to release to the EPA. In time-critical situations, the peer review may be concurrent with the release of a draft document to the EPA. Errors discovered in the peer review process will be reported by the reviewer to the originator of the document, who will be responsible for corrective action.
- The PM will review project documentation (logbooks, chain of custody forms, etc.) to ensure the SAP was followed and that sampling activities were adequately documented. The PM will document deficiencies and will be responsible for corrective actions.

9.7.2 EPA Assessment Activities

EPA assessment activities, which can include surveillance, management system reviews, readiness reviews, technical system audits, performance evaluation, and audits and assessments of data quality, have not been formally identified to WESTON by the EPA at the time of completion of the SAP.

9.7.3 Project Status Reports to Management

It is standard procedure for the WESTON PM to report to the EPA SAM any issues, as they occur, that arise during the course of the project that could affect data quality, data use objectives, the project objectives, or project schedules.

9.7.4 Reconciliation of Data with DQOs

Assessment of data quality is an ongoing activity throughout all phases of a project. The following outlines the methods to be used by WESTON for evaluating the results obtained from the project.

- Review of the DQO outputs and the sampling design will be conducted by the WESTON PM and the EPA QAO prior to sampling activities. The QAO reviewer will submit comments to the WESTON PM for action, comment, or clarification. This process will be iterative.
- A preliminary data review will be conducted by WESTON. The purpose of this review is to look for problems or anomalies in the implementation of the sample collection and analysis procedures and to examine QC data for information to verify assumptions underlying the DQOs and the SAP.
- When appropriate to sample design, basic statistical quantities will be calculated and the data will be graphically represented.

- When appropriate to the sample design and if specifically tasked to do so by the EPA SAM, WESTON will select a statistical hypothesis test and identify assumptions underlying the test.
- When appropriate to the sample design and if specifically tasked to do so by the EPA SAM, WESTON will examine the underlying assumptions of the statistical hypothesis test in light of the environmental data. This will be accomplished by determining the approach for verifying assumptions, performing tests for assumptions, and determining corrective actions.

10.0 REFERENCES

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APPENDIX A - COORDINATION SHEET

APPENDIX B - DATA QUALITY OBJECTIVE PROCESS WORKSHEET

Data Quality Objective Process Worksheet

1. **State the Problem** - Summarize the contamination problem that will require new environmental data, and identify the resources available to resolve the problem.

Planning Team:

Matt Mitguard, USEPA

Dan McMindes, USACE

Carol Yuge, Weston Solutions, Inc.

Amanda K. Cohan, Weston Solutions, Inc.

Matt Mitguard of the USEPA is the primary decision maker of the scoping team.

Problem:

Since 1959, the Keysor site has been operating as a resin compound manufacturer facility, producing polyvinyl chloride resins and compounds. The polyvinyl chloride resins and compounds are produced from a polymerization reaction that uses volatile organic compounds (VOCs) as raw materials. It has been reported that Keysor ceased resin manufacturing operations in December 2002.

An unlined pond located on site was utilized for disposal of waste liquids and solids produced during the manufacturing process starting in the early 1960's until 1978. The pond was ordered closed in 1973 however, Keysor continued to discharge into the pond illegally until approximately 1978. Additionally, several spills have been reported on site, including but not limited to wastewater spills and processed water spills.

Soil and groundwater sampling in the vicinity of the site will be required to document the presence of hazardous materials in site soils, and to document an observed release to groundwater.

Available Resources:

Current budget not to exceed approximately \$120,000; use of either USEPA CLP or Region 9 laboratories; EPA Quality Assurance Office (QAO) data validation services; WESTON personnel; subcontracted drilling personnel. All work and reporting should be completed by July 29, 2005.

2. **Identify the Decision** - Identify the decision that requires new environmental data to address the contamination problem.

Principal Study Questions:

Can an observed release of VOCs (vinyl chloride, vinyl acetate, and trichloroethene [TCE]) from the site to groundwater beneath the site be established? Can the presence of

hazardous substances in the source be documented? Can a release to the Santa Clara River surface watershed be documented?

Define the alternative actions that could result from the resolution of the principal study question:

- a) The site could be added to the National Priorities List through the Hazard Ranking System (HRS) process;
- b) no further action could occur at the site.

Decision Statement:

If groundwater samples are found to be contaminated with any VOCs above the corresponding action levels, an observed release will be documented and integrated into the site's HRS score. If site soils are found to be contaminated by VOCs, then the presence of hazardous substances in the source will be documented. If sediment samples are found to be contaminated with any VOCs above corresponding action levels, then an observed release to surface water will be documented and integrated into the site's HRS score.

3. **Identify Inputs to the Decision** - Identify the information needed to support the decision, and specify which inputs require new environmental data.

Information required to resolve the decision statement: Definitive laboratory analysis of VOCs in groundwater. Definitive laboratory analysis of VOCs in site soils. Definitive laboratory analysis of VOCs in on site sediment samples. Information pertaining to prior operations and the utilization and containment of materials used for those operations.

Source(s) for information: The primary source of information will be the results of WESTON's groundwater, soil, and sediment sampling event. Another potential source could include prior site investigation reports. In addition, city, state, and county agencies may have information pertaining to the site.

Information needed to establish action levels: The action levels dictated by the HRS for this investigation are three times the background concentrations of individual VOCs found in groundwater, soil, and sediment samples collected on and beneath the site.

Confirm that measurement methods exist to provide data: CLPAS OLM04.3 for volatiles in soil and sediment and CLPAS OLC03.2 for volatiles in groundwater.

4. **Define the Study Boundaries** - Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.

Specific characteristics that define population being studied: Elevated concentrations of VOCs found in groundwater, soil, and sediment.

Spatial boundary of decision statement: Groundwater, soil, and sediment beneath and

downgradient of the site.

Temporal boundary of decision statement: The data will reflect the condition of contaminant leaching into groundwater and surface water in the foreseeable future.

When to collect samples: There are no constraints for collecting samples.

Practical constraints on data collection: Currently there are no existing monitoring wells on-site or downgradient of the site. There may be site access issues with current property management.

5. **Develop a Decision Rule -** Develop logical "if...then" statements that define the conditions that would cause the decision maker to choose among alternative actions.

Statistical parameter that characterizes a population: Each analytical result, not statistical parameter, will be evaluated against the action levels.

Specify the action level(s) for the study: The action levels dictated by the HRS for this investigation are more than three times the background concentrations of VOCs found in groundwater, soil, and sediment collected downgradient of the site.

Decision Rules:

- a) If groundwater samples are found to contain concentrations of VOCs of at least three times the background concentration, then an observed release will be documented and integrated into the site's HRS score.
- b) If source materials (site soils) are found to be contaminated by VOC's, then the presence of hazardous substances in the source will be documented and integrated into the site's score.
- c) If sediment samples are found to contain concentrations of VOCs of at least three times the background concentration, then an observed release will be documented and integrated into the site's HRS score.

6. **Specify the Limits on Decision Errors -** Specify the decision makers acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data.

Use of biased sampling points precludes statistical determination of limits on decision errors. Measurement error, rather than sampling error, is deemed to be the primary factor affecting any decision error. Validated, definitive data will be required to limit measurement error. Sampling error will be limited to the extent practicable by following approved USEPA methods and applicable SOPs. Sampling error and tolerable limits cannot be quantified.

7. Optimize the Design for Obtaining Data - Identify the most resource-effective sampling and analysis design for generating data that are expected to satisfy the DQOs.

One goal of the sampling event is to establish whether an observed release to groundwater and soil beneath the site has occurred. Groundwater samples will be collected cross gradient and downgradient of the site to fulfill this goal. Based on the local topography, groundwater flow direction is estimated..

The second goal of this sampling event is to document the presence of hazardous substances in the source. Biased soil samples will be collected in specific locations where contaminants are suspected. Locations to be sampled include the former wastewater pond area, the wastewater tank area, areas surrounding several sumps, the drum storage area, and the loading silos located adjacent to the railroad tracks.

The third goal of this sampling event is to establish whether an observed release to surface water has occurred. Sediment samples will be collected from the unlined ditch on site that empties into the Santa Clara River to fulfill this goal.

APPENDIX C - SITE SPECIFIC HEALTH & SAFETY PLAN

SITE HEALTH AND SAFETY PLAN (HASP)-FORM 1

Prepared by: Amanda K. Cohan

W.O. Number: 20074.025.136

Date: March 24, 2005

Project Identification

Office: Sherman Oaks, CA (SCA)
 Site Name: Keysor Century
 Client: USACE/USEPA
 Work Location Address: 26000 Springbrook Avenue, Saugus, CA

Site History:

Since 1959, the Keysor site has been operating as a resin compound manufacturer facility, producing polyvinyl chloride resins and compounds. The polyvinyl chloride resins and compounds are produced from a polymerization reaction that uses volatile organic compounds (VOCs) as raw materials.

Scope of Work:

Install five groundwater monitoring wells, collect five groundwater samples, 60 soil samples, and two sediment samples at locations throughout the site. An air rotary rig will be used to advance five borings to a depth at which groundwater is first encountered. A hollow stem auger rig will be used to advance the soil borings to the appropriate sample depth. Sediment samples will be collected using disposable scoops. Groundwater samples will be analyzed for VOCs. Soil samples will be collected using a hand auger or acetate sleeve. Soil samples will be analyzed for VOCs.

☐ Site visit only; site HASP not necessary. List personnel here and sign off below:

Regulatory Status:

Site regulatory status:

CERCLA/SARA RCRA Other
 Federal Agency

☒ U.S. EPA ☐ U.S. EPA ☐ DOE
☐ State ☐ State ☒ USACE
☐ NPL Site NRC ☐ Air Force
☐ OSHA ☐ 10 CFR 20 ☐ _____
 [Hazard Communication (Req'd See Attachment D)
☐ 1910 ☐ 1926 ☐ State

X Safety Officer Manual (Required to be On-Site)

Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test ☐ _____
☐ Air Emissions ☐ _____
☐ Asbestos ☐ _____
☐ Industrial Hygiene ☐ _____
☐ _____ ☐ _____

Review and Approval Documentation:

Reviewed by:

SO/DSM/CHS

Ben Castellana

Name (Print)

Signature

Date: _____

Approved by:

Project Manager

Carol Yuge

Name (Print)

Signature

Date: _____

Hazard Assessment and Equipment Selection:

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the SHSC and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to Safety Officer Manual Section 2, Personal Protection Program, for guidance.)

☐ SHSC ☒ Site Manager

Amanda K. Cohan

Name (Print)

Signature

Date: _____

Project start date: 05/23/2005

End date: 06/3/2005

This site HASP must be reissued/reapproved for any activities conducted after:

Date: 05/23/06

Amendment date(s)

By:

1.
2.
3.
4.

WESTON REPRESENTATIVES-FORM 2

Organization/Branch	Name/Title	Address	Telephone
WESTON/Seattle	Frank Monahan Program Manager	190 Queen Anne Ave, North Suite 200 Seattle, WA 98109-4927	(206) 521-7600
WESTON/Sherman Oaks	Carol Yuge Project Manager/ Field Sampling QC Coordinator	14724 Ventura Blvd. Suite 1000 Sherman Oaks, CA 91403	(818) 382-1806
WESTON/Sherman Oaks	Amanda K. Cohan Field Manager	14724 Ventura Blvd. Suite 1000 Sherman Oaks, CA 91403	(707) 839-3659
WESTON/Sherman Oaks	Ben Castellana Field Assistant	14724 Ventura Blvd. Suite 1000 Sherman Oaks, CA 91403	(818) 382-1813

Roles and Responsibilities: The Project Manager is responsible for management of the site investigation work assignment. The Field Sampling QC Coordinator is responsible for making sure that field QC requirements are met during the sampling event. The Field Manager is responsible for completion of technical and field activities associated with this site investigation

WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone
To be determined.			

Roles and Responsibilities: Operate the air rotary rig and the hollow stem auger/direct push rig for soil and groundwater sampling, under WESTON direction.

SITE-SPECIFIC HEALTH AND SAFETY PERSONNEL

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Ben Castellana

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

Qualifications: 40-Hour HAZWOPER, current 8-Hour HAZWOPER Refresher, SHSC (D), First Aid, CPR, BBP

Designated alternates include: Bill Clarke

The Dangerous Goods Shipper for activities to be conducted at this site is: _____

☒ Dangerous Goods Shipping not required for this site because only environmental samples will be shipped.

Qualifications:

Designated alternates include:

The Environmental Compliance Officer (ECO) for activities to be conducted at this site is:

The ECO has total responsibility for ensuring that the provisions of the Site EC Plan are adequate and implemented in the field.

Qualifications: Hazardous Waste Management & Shipping for Environmental Professionals

Designated alternates include:

HEALTH AND SAFETY EVALUATION-FORM 3

Hazard Assessment

Background Review: ☐ Complete ☒ Partial

If partial why? Groundwater sampling has not been conducted at this site; therefore, background contaminants have not been identified. The HASP will be amended to include hazards noted during the field activities.

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1	Monitoring wells will be installed and groundwater sampled	Five borings will be advanced to a maximum depth of 100 feet below ground surface (bgs) and groundwater will be collected if encountered.	Tentatively beginning week of May 23, 2005
2	Borings will be drilled and soil will be sampled	Approximately 15 borings will be advanced to approximately 15 feet bgs and four soil samples at descending depths will be collected at each location.	Tentatively beginning week of May 23, 2005
3	Sediment samples will be collected	Two sediment samples will be collected in the unlined ditch located on site.	Tentatively beginning week of May 23, 2005

Types of Hazards:

1, 2, and 3 Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.

Physiochemical 1 <input type="checkbox"/> Flammable <input type="checkbox"/> Explosive <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> O ₂ Rich <input type="checkbox"/> O ₂ Deficient	Chemically Toxic 1 <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Carcinogen <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Mutagen <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Teratogen <input checked="" type="checkbox"/> Absorption <input type="checkbox"/> OSHA 1910.1000 Substance (Air Contaminants) <input checked="" type="checkbox"/> OSHA Specific Hazard Substance Standard (Refer to following page for listing)	Radiation 3 Ionizing: <input type="checkbox"/> Internal exposure <input type="checkbox"/> External exposure Non-ionizing: <input checked="" type="checkbox"/> UV <input type="checkbox"/> IR <input type="checkbox"/> RF <input type="checkbox"/> MicroW <input type="checkbox"/> Laser	Biological 2 <input type="checkbox"/> Etiological Agent <input checked="" type="checkbox"/> Other (plant, insect, animal) <input checked="" type="checkbox"/> Physical Hazards 4 <input checked="" type="checkbox"/> Construction Activities
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Source/Location of Contaminants and Hazardous Substances:

Directly Related to Tasks <input type="checkbox"/> Air <input type="checkbox"/> Other Surface <input checked="" type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Surface Water <input type="checkbox"/> Sanitary Wastewater <input type="checkbox"/> Process Wastewater <input checked="" type="checkbox"/> Other Sediment	Indirectly Related to Tasks — Nearby Process(es) That Could Affect Team Members: <input type="checkbox"/> Client Facility/WESTON Work Location <input type="checkbox"/> Nearby Non-Client Facility Describe: <input type="checkbox"/> Have activities (task[s]) been coordinated with facility?
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HEALTH AND SAFETY EVALUATION—CHEMICAL HAZARDS OF CONCERN FORM 4 (REVISED 02/1998)

☐ N/A

Chemical Contaminants of Concern

Provide the data requested for chemical contaminants on HASP Form 25 or attach data sheets from an acceptable source such as NIOSH pocket guide, condensed chemical dictionary, ACGIH TLV booklet, etc. List chemicals and concentrations below and locate data sheets in Attachment B of this HASP.

☐ N/A

Identify hazardous materials used or on-site and attach Material Safety Data Sheets (MSDSs) for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances. Ensure that all subcontractors and other parties working nearby are informed of the presence of these chemicals and the location of the MSDSs. Obtain from subcontractors and other parties, lists of the hazardous materials they use or have on-site and identify location of the MSDSs here. List chemicals and quantities below and locate MSDSs in Attachment B of this HASP.

Chemical Name	Concentration (if known)	Chemical Name	Quantity
Vinyl Acetate	Unknown	Isobutylene in air (compound)	100 ppm x 0.5 Kg
Vinyl Chloride	Unknown	Hydrochloric Acid (preservative)	Approximately 45 preserved vials
Trichloroethylene	Unknown	Alconox	1-gallon carton

OSHA-SPECIFIC HAZARDOUS SUBSTANCES

The following substances may require specific medical, training, or monitoring based on concentration or evaluation of risk. See the appropriate citation listed under 29 CFR 1910 or 1926 for additional information.

- | | | | |
|--|--|---|--|
| <input type="checkbox"/> 1910.1001 Asbestos | <input type="checkbox"/> 1910.1002 Coal tar pitch volatiles | <input type="checkbox"/> 1910.1003 4-Nitrobiphenyl, etc. | <input type="checkbox"/> 1910.1004 alpha-Naphthylamine |
| <input type="checkbox"/> 1910.1005 [Reserved] | <input type="checkbox"/> 1910.1006 Methyl chloromethyl ether | <input type="checkbox"/> 1910.1007 3,3'-Dichlorobenzidine (and its salts) | <input type="checkbox"/> 1910.1008 bis-Chloromethyl ether |
| <input type="checkbox"/> 1910.1009 beta-Naphthylamine | <input type="checkbox"/> 1910.1010 Benzidine | <input type="checkbox"/> 1910.1011 4-Aminodiphenyl | <input type="checkbox"/> 1910.1012 Ethyleneimine |
| <input type="checkbox"/> 1910.1013 beta-Propiolactone | <input type="checkbox"/> 1910.1014 2-Acetylaminofluorene | <input type="checkbox"/> 1910.1015 4-Dimethylaminoazobenzene | <input type="checkbox"/> 1910.1016 N-Nitrosodimethylamine |
| <input checked="" type="checkbox"/> 1910.1017 Vinyl chloride | <input type="checkbox"/> 1910.1018 Inorganic arsenic | <input type="checkbox"/> 1910.1025 Lead (Att. FLD# 46) | <input type="checkbox"/> 1910.1027 Cadmium |
| <input type="checkbox"/> 1910.1028 Benzene | <input type="checkbox"/> 1910.1029 Coke oven emissions | <input type="checkbox"/> 1910.1043 Cotton dust | <input type="checkbox"/> 1910.1044 1,2-Dibromo-3-chloropropane |
| <input type="checkbox"/> 1910.1045 Acrylonitrile | <input type="checkbox"/> 1910.1047 Ethylene oxide | <input type="checkbox"/> 1910.1048 Formaldehyde | <input type="checkbox"/> 1910.1050 Methylenedianiline |
| <input type="checkbox"/> 1910.1051 1,3 Butadiene | <input type="checkbox"/> 1910.1052 Methylene chloride | | |

HEALTH AND SAFETY EVALUATION — 2 BIOLOGICAL HAZARDS OF CONCERN-FORM 5

☐ Poisonous Plants (FLD 43)

Location/Task No(s):

Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

☒ Snakes, Reptiles (FLD 43)

Location/Task No(s):

Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No
Immunization required: ☐ Yes ☒ No

☒ Insects (FLD 43)

Location/Task No(s):

Source: ☐ Known ☒ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☒ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No
Immunization required: ☐ Yes ☒ No

☐ Animals (FLD 43)

Location/Task No(s):

Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

FLD 43 — WESTON Biohazard Field Operating Procedures: Att. OP ☐

☐ Sewage

Location/Task No(s):

Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

Tetanus Vaccination within Past 10 yrs: ☐ Yes ☐ No

☐ Etiologic Agents (List)

Location/Task No(s):

Source: ☐ Known ☐ Suspect
Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

FLD 44 — WESTON Bloodborne Pathogens Exposure Control Plan – First Aid Procedures: Att. OP ☒

FLD 45 — WESTON Bloodborne Pathogens Exposure Control Plan – Working with Infectious Waste: Att. OP ☐

HEALTH AND SAFETY EVALUATION — 3 RADIATION HAZARDS OF CONCERN FORM 6 (REVISED 02/1998)

NONIONIZING RADIATION

Task No.	Type of Nonionizing Radiation	Source On-Site	TLV/PEL	Wavelength Range	Control Measures	Monitoring Instrument
1,2,3	Ultraviolet	Sun			Sunscreen, stay hydrated	
N/A	Infrared					
N/A	Radio Frequency					
N/A	Microwave					
N/A	Laser					

IONIZING RADIATION

Task No.	Radionuclide	Major Radiations	Radioactive Half-Life (Years)	DAC ($\mu\text{Ci}/\text{mL}$)			Surface Contamination Limit	Monitoring Instrument
				D	W	Y		

HEALTH AND SAFETY EVALUATION — 4 PHYSICAL HAZARDS OF CONCERN-FORM 7

Phy. Haz. Cond.	Physical Hazard	Attach OP	WESTON OP Titles
Loud noise	Hearing loss/disruption of communication	<input checked="" type="checkbox"/>	FLD01 - Noise Protection
Inclement weather	Rain/humidity/cold/ice/snow/lightning	<input type="checkbox"/>	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	<input type="checkbox"/>	FLD03 - Hot Process - Steam
Heat stress	Burns/hot surfaces/low pressure steam	<input type="checkbox"/>	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	<input checked="" type="checkbox"/>	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	<input type="checkbox"/>	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	<input type="checkbox"/>	FLD07 - Wet Feet
Confined spaces	Falls/burns/drowning/engulfment/electrocution	<input type="checkbox"/>	FLD08 - Confined Space Entry
Explosive vapors	Thermal burns/impaction/dismemberment	<input type="checkbox"/>	FLD09 - Hot Work
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	<input checked="" type="checkbox"/>	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	<input checked="" type="checkbox"/>	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	<input checked="" type="checkbox"/>	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	<input type="checkbox"/>	FLD13 - Structural Integrity
Hostile persons	Bodily injury	<input type="checkbox"/>	FLD14 - Site Security
Remote area	Slips/trips/falls/back strain/communication	<input type="checkbox"/>	FLD15 - Remote Area
Improper cyl. handling	Mechanical injury/fire/explosion/suffocation	<input type="checkbox"/>	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	<input type="checkbox"/>	FLD17 - Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	<input type="checkbox"/>	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	<input type="checkbox"/>	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	<input type="checkbox"/>	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	<input type="checkbox"/>	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	<input checked="" type="checkbox"/>	FLD22 - Heavy Equipment Operation
Moving mech. parts	Overhead hazards/electrocution	<input type="checkbox"/>	FLD23 - Cranes/Lifting Equipment Operation
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD24 - Aerial Lifts/Manlifts
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	<input type="checkbox"/>	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	<input type="checkbox"/>	FLD27 - Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	<input type="checkbox"/>	FLD28 - Excavating/Trenching
Improper material handling	Back injury/crushing from load shifts	<input type="checkbox"/>	FLD29 - Materials Handling
Physiochemical	Explosions/fires from oxidizing, flam./corr. material	<input type="checkbox"/>	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	<input type="checkbox"/>	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	<input type="checkbox"/>	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	<input type="checkbox"/>	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	<input checked="" type="checkbox"/>	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	<input type="checkbox"/>	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	<input type="checkbox"/>	FLD36 - Welding/Cutting/Burning
Impact/thermal	Thermal burns/high pressure impaction/heat stress	<input type="checkbox"/>	FLD37 - High Pressure Washers
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	<input checked="" type="checkbox"/>	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	<input type="checkbox"/>	FLD39 - Illumination
Fire/explosion	Burns/impaction	<input type="checkbox"/>	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	<input type="checkbox"/>	FLD41 - Std. Hand/Emergency Signals
Energy/release	Unexpected release of energy	<input type="checkbox"/>	FLD42 - Lockout/Tagout
General field work	Insects, plants, animals, snakes, reptiles (Haz. Eval. Form 2)	<input checked="" type="checkbox"/>	FLD43 - Biological Hazards
Providing first aid	HBV, HIV (Haz. Eval. Form 2)	<input type="checkbox"/>	FLD44 - BBP for First Aid Providers
Handling infectious waste	HBV, HIV (Haz. Eval. Form 2)	<input type="checkbox"/>	FLD45 - BBP for Infectious Waste
Lead contaminated sites	Lead poisoning	<input type="checkbox"/>	FLD46 - Control of Exposure to Lead
Puncture/cuts	Cuts/dismemberment/gouges	<input type="checkbox"/>	FLD47 - Clearing, Grubbing and Logging Operations
Not applicable	Not applicable	<input checked="" type="checkbox"/>	FLD48 - OSHA Inspections
Drilling hazards	Electrocution/overhead hazards/pinch points	<input checked="" type="checkbox"/>	2.5 - Drilling Safety Guide

**TASK-BY-TASK RISK ASSESSMENT-FORM 8
(COMPLETE ONE SHEET FOR EACH TASK)**

TASK DESCRIPTION

TASK 1 –Advance five borings using an air rotary rig and install monitoring wells to conduct groundwater sampling.

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Hard hat	First Aid Kit	Sample coolers
Safety Boots	PID	Sample Containers
Hearing Protection	Air Rotary Rig	Zip-Lock Bags
Protective Glasses	Hand Auger	Trash Bags
Nitrile Surgical Gloves	Paper Towels	

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential risk of exposure to VOCs in groundwater. Contaminant concentrations expected to be low to medium in groundwater. No respiratory hazard anticipated. Use of nitrile gloves and good housekeeping protocols will minimize contact or absorption with groundwater potentially contaminated with VOCs.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential hazards include being struck by drilling equipment and tripping/falling. Maintain eye contact with drilling equipment and other heavy equipment operators when working near them.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Insects, such as spiders, and reptiles, possibly rattlesnakes, may be present at work locations. Use of gloves and general awareness will be implemented.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Given the time of year and work location, sun exposure is expected. Use of sunscreen and consumption of fluids will be implemented during field activities.

LEVELS OF PROTECTION/JUSTIFICATION

Level D, since no air pathway hazards are known or suspected in the breathing zone. If elevated monitoring instrument readings are observed, the team will withdraw immediately and reassess the situation.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All field activities will be performed in accordance with this HASP and WESTON's standard operating procedures outlined in WESTON's Safety Officer Field Manual.

FDL01, FLD05, FLD10, FLD11, FLD12, FLD22, FLD34, FLD38, FLD43, FLD48, and 2.5

**TASK-BY-TASK RISK ASSESSMENT-FORM 8
(COMPLETE ONE SHEET FOR EACH TASK)**

TASK DESCRIPTION

TASK 2 –Advance 15 borings using a hollow stem auger rig or direct push rig to conduct soil sampling.

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Hard hat	First Aid Kit	Sample coolers
Safety Boots	PID	Sample Containers
Hearing Protection	Hollow Stem Auger Rig	Zip-Lock Bags
Protective Glasses	Hand Auger	Trash Bags
Nitrile Surgical Gloves	Paper Towels	

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential risk of exposure to VOCs in soil. Contaminant concentrations expected to be low to medium in soil. No respiratory hazard anticipated. Use of nitrile gloves and good housekeeping protocols will minimize contact or absorption with soil potentially contaminated with VOCs.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential hazards include being struck by drilling equipment and tripping/falling. Maintain eye contact with drilling equipment and other heavy equipment operators when working near them.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Insects, such as spiders, and reptiles, possibly rattlesnakes, may be present at work locations. Use of gloves and general awareness will be implemented.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Given the time of year and work location, sun exposure is expected. Use of sunscreen and consumption of fluids will be implemented during field activities.

LEVELS OF PROTECTION/JUSTIFICATION

Level D, since no air pathway hazards are known or suspected in the breathing zone. If elevated monitoring instrument readings are observed, the team will withdraw immediately and reassess the situation.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All field activities will be performed in accordance with this HASP and WESTON's standard operating procedures outlined in WESTON's Safety Officer Field Manual.

FDL01, FLD05, FLD10, FLD11, FLD12, FLD22, FLD34, FLD38, FLD43, FLD48, and 2.5

**TASK-BY-TASK RISK ASSESSMENT-FORM 8
(COMPLETE ONE SHEET FOR EACH TASK)**

TASK DESCRIPTION

TASK 3 –Collect 2 sediment samples from the unlined ditch located on the site.

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Safety Boots	Hand Auger	Sample coolers
Protective Glasses	Plastic scoops	Sample Containers
Nitrile Surgical Gloves	Zip-Lock Bags	
First Aid Kit	Trash Bags	
PID	Paper Towels	

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential risk of exposure to VOCs in sediment. Contaminant concentrations expected to be low to medium in sediment. No respiratory hazard anticipated. Use of nitrile gloves and good housekeeping protocols will minimize contact or absorption with sediment potentially contaminated with VOCs.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Potential hazards include being struck by drilling equipment and tripping/falling. Maintain eye contact with drilling equipment and other heavy equipment operators when working near them.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Insects, such as spiders, and reptiles, possibly rattlesnakes, may be present at work locations. Use of gloves and general awareness will be implemented.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Given the time of year and work location, sun exposure is expected. Use of sunscreen and consumption of fluids will be implemented during field activities.

LEVELS OF PROTECTION/JUSTIFICATION

Level D, since no air pathway hazards are known or suspected in the breathing zone. If elevated monitoring instrument readings are observed, the team will withdraw immediately and reassess the situation.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

All field activities will be performed in accordance with this HASP and WESTON's standard operating procedures outlined in WESTON's Safety Officer Field Manual.

FDL01, FLD05, FLD10, FLD11, FLD12, FLD22, FLD34, FLD38, FLD43, FLD48, and 2.5

PERSONNEL PROTECTION PLAN-FORM 9 (REVISED 02/1998)

Engineering Controls

Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)

1,2,3 Air monitoring will be performed at each sampling location. Situate workers on upwind side of boring wherever possible.

Administrative Controls

Describe Administrative Controls used as part of Personnel Protection Plan:

Task(s)

1,2,3 An initial health and safety tailgate meeting will be held at the site before work commences. Work will be completed in accordance with this HASP under the supervision/guidance of the SHSC.

Personal Protective Equipment

Action Levels for Changing Levels of Protection. Refer to HASP Form 13, Site Air Monitoring Program—Action Levels. Define Action Levels for up or down grade for each task:

Task(s)

1,2,3 Level D. PID in breathing zone; 50 ppm or less above background—continue to work in Level D. Consistent PID readings in breathing zone greater than 50 ppm above background that do not dissipate—stop work. Requires Level C, personal protection. Although PID readings greater than 50 ppm are not anticipated, the breathing zone action guidance document will be implemented if PID detects over 50 ppm.

DESCRIPTION OF LEVELS OF PROTECTION

Level D	Level D Modified
<p>Task(s): All</p> <p><input checked="" type="checkbox"/> Head Hard Hat</p> <p><input checked="" type="checkbox"/> Eye and Face Safety glasses</p> <p><input checked="" type="checkbox"/> Hearing Earplugs as necessary</p> <p><input type="checkbox"/> Arms and Legs Only</p> <p><input type="checkbox"/> Appropriate Work Uniform Coveralls, or appropriate clothing</p> <p><input checked="" type="checkbox"/> Hand - Gloves Nitrile</p> <p><input checked="" type="checkbox"/> Foot - Safety Boots Steel Toe</p> <p><input type="checkbox"/> Fall Protection</p> <p><input type="checkbox"/> Flotation</p> <p><input type="checkbox"/> Other</p>	<p>Task(s): All</p> <p><input type="checkbox"/> Head</p> <p><input type="checkbox"/> Eye and Face</p> <p><input type="checkbox"/> Hearing</p> <p><input type="checkbox"/> Arms and Legs Only</p> <p><input type="checkbox"/> Whole Body</p> <p><input type="checkbox"/> Apron</p> <p><input type="checkbox"/> Hand - Gloves</p> <p><input type="checkbox"/> Gloves</p> <p><input type="checkbox"/> Foot - Safety Boots</p> <p><input type="checkbox"/> Over Boots</p>

DESCRIPTION OF LEVELS OF PROTECTION FORM 10

Level C	Level B
Task(s): All	Task(s):
<input type="checkbox"/> Head	<input type="checkbox"/> Head
<input type="checkbox"/> Eye and Face	<input type="checkbox"/> Eye and Face
<input type="checkbox"/> Hearing	<input type="checkbox"/> Hearing
<input type="checkbox"/> Arms and Legs Only	<input type="checkbox"/> Arms and Legs Only
<input type="checkbox"/> Whole Body	<input type="checkbox"/> Whole Body
<input type="checkbox"/> Apron	<input type="checkbox"/> Apron
<input type="checkbox"/> Hand - Gloves	<input type="checkbox"/> Hand - Gloves
<input type="checkbox"/> Gloves	<input type="checkbox"/> Gloves
<input type="checkbox"/> Gloves	<input type="checkbox"/> Gloves
<input type="checkbox"/> Foot - Safety Boots	<input type="checkbox"/> Foot - Safety Boots
<input type="checkbox"/> Outer Boots	<input type="checkbox"/> Outer Boots
<input type="checkbox"/> Boots (Other)	<input type="checkbox"/> Boots (Other)
<input type="checkbox"/> Half Face	<input type="checkbox"/> SAR - Airline
<input type="checkbox"/> Cart./Canister	<input type="checkbox"/> SCBA
<input type="checkbox"/> Full Face	<input type="checkbox"/> Comb. Airline/SCBA
<input type="checkbox"/> Cart./Canister	<input type="checkbox"/> Cascade System
<input type="checkbox"/> PAPR	<input type="checkbox"/> Compressor
<input type="checkbox"/> Cart./Canister	<input type="checkbox"/> Fall Protection
<input type="checkbox"/> Type C	<input type="checkbox"/> Flotation
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Other
<input type="checkbox"/> Flotation	
<input type="checkbox"/> Other	

SITE OR PROJECT HAZARD MONITORING PROGRAM-FORM 11

Air Monitoring Instruments

Instrument Selection and Initial Check Record

Reporting Format: ☒ Field Notebook ☐ Field Data Sheets* ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
<input type="checkbox"/> CGI				<input type="checkbox"/>		
<input type="checkbox"/> O ₂				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O ₂				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O ₂ /tox-PPM, H ₂ S, H ₂ S/CO				<input type="checkbox"/>		
<input type="checkbox"/> RAD				<input type="checkbox"/>		
<input type="checkbox"/> GM (Pancake)				<input type="checkbox"/>		
<input type="checkbox"/> NaI (Micro R)				<input type="checkbox"/>		
<input type="checkbox"/> ZnS (Alpha Scintillator)				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input checked="" type="checkbox"/> PID	1,2,3			<input type="checkbox"/>		
<input type="checkbox"/> HNu 10.2				<input type="checkbox"/>		
<input type="checkbox"/> HNu 11.7				<input type="checkbox"/>		
<input type="checkbox"/> Photovac, TMA				<input type="checkbox"/>		
<input type="checkbox"/> OVM				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input type="checkbox"/> FID				<input type="checkbox"/>		
<input type="checkbox"/> Fox 128				<input type="checkbox"/>		
<input type="checkbox"/> Heath, AID, Other				<input type="checkbox"/>		
<input type="checkbox"/> RAM, Mini-RAM, Other _____				<input type="checkbox"/>		
<input type="checkbox"/> Monitox				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Personal Sampling				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Bio-Aerosol Monitor				<input type="checkbox"/>		
<input type="checkbox"/> Pump - MSA, Dräger, Sensidyne				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		

*Refer to Attachment E.

SITE OR PROJECT HAZARD MONITORING PROGRAM-FORM 12

Air Monitoring Instruments Calibration Record

[illegible]

SITE AIR MONITORING PROGRAM FORM 13

Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/TLV/REL. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level		Action
<input type="checkbox"/> Explosive atmosphere		Ambient Air Concentration	Confined Space Concentration	
		<10% LEL	0 to 1% LEL	Work may continue. Consider toxicity potential.
		10 to 25% LEL	1 to 10% LEL	Work may continue. Increase monitoring frequency.
		>25% LEL	>10% LEL	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Oxygen		Ambient Air Concentration	Confined Space Concentration	
		<19.5% O ₂	<19.5% O ₂	Leave area. Re-enter only with self-contained breathing apparatus.
		19.5% to 25% O ₂	19.5% to 23.5% O ₂	Work may continue. Investigate changes from 21%.
		>25% O ₂	>23.5% O ₂	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Radiation		< 3 times background 3 times background to < 1 mR/hour > 1 mrem/hour		Continue work. Radiation above background levels (normally 0.01-0.02 mR/hr) signifies possible radiation source(s) present. Continue investigation with caution. Perform thorough monitoring. Consult with a Health Physicist. Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of Health Physicist.
<input checked="" type="checkbox"/> Organic gases and vapors	1,2,3	PID readings in breathing zone (BZ) ≤ 1 ppm unit above background. PID readings in BZ consistently > 50 ppm unit above background that do not dissipate. Although PID readings greater than 50 ppm are not anticipated, the breathing zone action guidance document will be implemented if PID detects over 50 ppm. Negligible visible dust.		Continue working in Level D. Cease work.
<input checked="" type="checkbox"/> Inorganic gases, vapors, and particulates	1,2,3	Negligible visible dust. Visible dust that does not dissipate.		Continue working in Level D. Cease work.

CONTINGENCIES-FORM 14

Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility (LMF)	Community Hospital	(323) 583-1931
WESTON Medical Emergency Contact	Dr. Elyane Theriault	1-800-229-3674
WESTON Health and Safety	Corporate Health and Safety	(505) 837-6566
Fire Department	911	911
Police Department	911	911
On-Site Coordinator- SHSC	Ben Castellana	(818) 382-1813
Client Site Contact		
Site Telephone or Nearest Telephone		(818) 414-5608

Local Medical Emergency Facility(s)

Name of Hospital: Henry Mayo Newhall Memorial Hospital

Address: 23845 McBean Parkway, Valencia, California, 91355

Phone No.: 661-253-8000

Name of Contact: Emergency Room

Phone No.: 911

Type of Service:

- ☐ Physical trauma only
☐ Chemical exposure only
☒ Physical trauma and chemical exposure
☒ Available 24 hours

Route to Hospital (written detail):

Head south on Springbrook Avenue. Turn right on Drayton Street. Turn right on San Fernando Road. Turn left onto Magic Mountain Parkway. Turn left on Valencia Boulevard. Turn left on McBean Parkway. Hospital is on the right side.

Travel time from site:

5 minutes

Distance to hospital:

2.8 miles

Name/no. of 24-hr ambulance service:
911 /

Secondary or Specialty Service Provider

Name of Hospital:

Address:

Phone No.:

Name of Contact:

Phone No.:

Type of Service:

- ☐ Physical trauma only
☐ Chemical exposure only
☐ Physical trauma and chemical exposure
☐ Available 24 hours

Route to Hospital (written detail):

Travel time from site:

Distance to hospital:

Name/no. of 24-hr ambulance service:
/

Figure 1. Route to Hospital

Refer to the map provided on the following page.



CONTINGENCIES-FORM 16

Response Plans

Medical - General

Provide first aid, if trained; assess and determine need for further medical assistance.

Transport, or arrange for transport, after appropriate decontamination.

First Aid Kit:

(1) 5 man

Type

General
field first aid
kit

Location

WESTON
field vehicle

Special First-Aid Procedures:

Cyanides on-site
☐ Yes ☒ No

If yes, contact LMF.
Do they have antidote kit?

☐ Yes ☐ No

Eyewash required

☐ Yes ☒ No

Type

Location

HF on-site

☐ Yes ☐ No

If yes, need
neutralizing ointment
for first-aid kit.
Contact LMF.

Shower required

☐ Yes ☒ No

Type

Location

Plan for Response to Spill/Release

In the event of a spill or release, ensure safety, assess situation, and perform containment and control measures, as appropriate.

- Cleanup per MSDSs if small; or sound alarm, call for assistance, notify Emergency Coordinator
- Evacuate to pre-determined safe place
- Account for personnel
- Determine if team can respond safely
- Mobilize per Site Spill Response Plan

Plan for Response to Fire/Explosion

In the event of a fire or explosion, ensure personal safety, assess situation, and perform containment and control measures, as appropriate:

- Sound alarm and call for assistance, notify Emergency Coordinator
- Evacuate to predetermined safe place
- Account for personnel
- Use fire extinguisher only if safe and trained in its use
- Stand by to inform emergency responders of materials and conditions

Fire Extinguishers ABC

Type/Location
ABC/WESTON field vehicle

/

/

/

/

/

Description of Spill Response Gear

Location

Description (Other Fire Response Equipment)

Location

Plan to Respond to Security Problems

Local police shall be contacted in the event of a security problem – Dial 911.

DECONTAMINATION PLAN-FORM 17

Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each level of protection are attached.

Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B

☐ Level C

☒ Level D

Modifications include:

Disposition of Decontamination Wastes

Provide a description of waste disposition, including identification of storage area, hauler, and final disposal site, if applicable:

Used PPE and disposable sampling equipment will be double bagged in plastic trash bags and disposed of in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE or dedicated equipment that is to be disposed of that can still be reused will be rendered inoperable before disposal.

Decontamination fluids that will be generated in the sampling event will consist of water and residual contaminants. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal to the sewer system.

Soil cuttings generated during the subsurface sampling will be containerized in 55-gallon drums and profiled for proper disposal at a licensed facility.

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows:

The direct push rods and/or hand auger will be decontaminated using a hot water steam-cleaning process.

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:

If non-dedicated sampling equipment is used, it will be washed in a tub with a mixture of potable water and non-phosphate detergent and scrubbed with brushes; rinsed three times with deionized water, and allowed to air dry between sample locations.

LEVEL D/MODIFIED LEVEL D DECONTAMINATION PLAN-FORM 18

Check indicated functions or add steps, as necessary:

Function**Description of Process, Solution, and Container**☒ Segregated equipment drop

Plastic sheeting and/or clean with a damp towel.

☐ Boot cover and glove wash☐ Boot cover and glove rinse☐ Tape removal - outer glove and boot☐ Boot cover removal☒ Outer glove removal

Remove inside-out. Double-bag for disposal.

HOTLINE☐ Suit/safety boot wash☐ Suit/boot/glove rinse☐ Safety boot removal☐ Suit removal☐ Inner glove wash☐ Inner glove rinse☐ Inner glove removal☐ Inner clothing removal**CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY**☐ Field wash☐ Redress**Disposal Plan, End of Day:**

All waste will be double-bagged in plastic trash bags. Waste may be stored in a bucket or drum on-site on a daily basis.

Disposal Plan, End of Week:

All waste will be double-bagged in plastic trash bags.

Disposal Plan, End of Project:

Double-bagged waste will be disposed of in an appropriate municipal refuse dumpster. Alternatively, it will remain onsite in 55-gallon drums for subsequent disposal by EPA or WESTON.

LEVEL C DECONTAMINATION PLAN-FORM 19

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
----------	---

<input checked="" type="checkbox"/> Segregated equipment drop	Plastic sheeting and/or clean with a damp towel.
---	--

<input checked="" type="checkbox"/> Boot cover and glove wash	Non-phosphate detergent in a tub.
---	-----------------------------------

<input checked="" type="checkbox"/> Boot cover and glove rinse	Potable water in a tub.
--	-------------------------

<input checked="" type="checkbox"/> Tape removal - outer glove and boot	Double-bag for disposal.
---	--------------------------

<input checked="" type="checkbox"/> Boot cover removal	Double-bag for disposal.
--	--------------------------

<input checked="" type="checkbox"/> Outer glove removal	Double-bag for disposal.
---	--------------------------

HOTLINE

<input checked="" type="checkbox"/> Suit/safety boot wash	Non-phosphate detergent in a tub, if necessary.
---	---

<input checked="" type="checkbox"/> Suit/boot/glove rinse	Potable water in a tub, if necessary.
---	---------------------------------------

<input checked="" type="checkbox"/> Safety boot removal	Bag for cleaning, if necessary.
---	---------------------------------

<input checked="" type="checkbox"/> Suit removal	Double-bag for disposal.
--	--------------------------

<input checked="" type="checkbox"/> Inner glove wash	Non-phosphate detergent in a tub, if necessary.
--	---

<input checked="" type="checkbox"/> Inner glove rinse	Potable water in a tub, if necessary.
---	---------------------------------------

<input checked="" type="checkbox"/> Facepiece removal	Designated area on a plastic sheet.
---	-------------------------------------

<input checked="" type="checkbox"/> Inner glove removal	Double-bag for disposal.
---	--------------------------

<input type="checkbox"/> Inner clothing removal	
---	--

CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY

<input checked="" type="checkbox"/> Field wash	Wash hands and face thoroughly.
--	---------------------------------

<input checked="" type="checkbox"/> Redress	Replace suit, if necessary.
---	-----------------------------

Disposal Plan, End of Day:

See Plan for Level D.

Disposal Plan, End of Week:

See Plan for Level D.

Disposal Plan, End of Project:

See Plan for Level D.

SITE PERSONNEL AND CERTIFICATION STATUS FORM 21

WESTON

Name: Carol Yuge Title: Project Manager/Field Sampling QC Coordinator Task(s): 1 Certification Level or Description: <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Amanda K. Cohan Title: Field Manager Task(s): 1 Certification Level or Description: <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Ben Castellana Title: Geologist Task(s): All Certification Level or Description: <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Bill Clarke Title: Geologist Task(s): All Certification Level or Description: <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)

TRAINING CURRENT - Training: All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910, 29 CFR 1926, or 29 CFR 1910.120.

FIT TEST CURRENT - Respirator Fit Testing: All persons, including visitors, entering any area requiring the use or potential use of any negative-pressure respirator must have had, as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI, within the last 12 months. If site conditions require the use of a full-face, negative-pressure, air-purifying respirator for protection from asbestos or lead, employees must have had a qualitative fit test, administered according to OSHA 29 CFR 1910.1001 or 1025/1926, within the last 6 months.

MEDICAL CURRENT - Medical Monitoring Requirements: All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910, or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM-FORM 23	
Site Name: Keysor Century	WO#: 20074.025.136
26000 Springbrook Avenue, Saugus, California	
I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).	

WO#: 20074.025.136

26000 Springbrook Avenue, Saugus, California

I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).

Signature

Date _____

[illegible]

TRAINING AND BRIEFING TOPICS-FORM 24

The following items will be covered at the site-specific training meeting, daily or periodically.

<input checked="" type="checkbox"/> Site characterization and analysis, Sec. 3.0, 29 CFR 1910.120 I	<input type="checkbox"/> Level A
<input checked="" type="checkbox"/> Physical hazards, HASP Form 07	<input type="checkbox"/> Level B
<input checked="" type="checkbox"/> Chemical hazards, HASP Form 04	<input type="checkbox"/> Level C
<input checked="" type="checkbox"/> Animal bites, stings, and poisonous plants	<input checked="" type="checkbox"/> Level D
<input type="checkbox"/> Etiologic (infectious) agents	<input checked="" type="checkbox"/> Monitoring, 29 CFR 1910.120 (h)
<input type="checkbox"/> Site control, 29 CFR 1910.120 d	<input checked="" type="checkbox"/> Decontamination, 29 CFR 1910.120 (k)
<input checked="" type="checkbox"/> Engineering controls and work practices, 29 CFR 1910.120 (g)	<input type="checkbox"/> Emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Heavy machinery	<input type="checkbox"/> Elements of an emergency response, 29 CFR 1910.120 (l)
<input type="checkbox"/> Forklift	<input checked="" type="checkbox"/> Procedures for handling site emergency incidents, 29 CFR 1910.120 (l)
<input type="checkbox"/> Backhoe	<input type="checkbox"/> Off-site emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Equipment	<input checked="" type="checkbox"/> Handling drums and containers, 29 CFR 1910.120 (j)
<input type="checkbox"/> Tools	<input type="checkbox"/> Opening drums and containers
<input type="checkbox"/> Ladder, 29 CFR 1910.27 (d)/29 CFR 1926	<input type="checkbox"/> Electrical material handling equipment
<input checked="" type="checkbox"/> Overhead and underground utilities	<input type="checkbox"/> Radioactive waste
<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Shock-sensitive waste
<input type="checkbox"/> Structural integrity	<input type="checkbox"/> Laboratory waste packs
<input type="checkbox"/> Unguarded openings - wall, floor, ceilings	<input type="checkbox"/> Sampling drums and containers
<input type="checkbox"/> Pressurized air cylinders	<input type="checkbox"/> Shipping and transport, 49 CFR 172.101, IATA
<input checked="" type="checkbox"/> Personal protective equipment, 29 CFR 1910.120 (g); 29 CFR 1910.134	<input type="checkbox"/> Tank and vault procedures
<input type="checkbox"/> Respiratory protection, 29 CFR 1910.120 (g); ANSI Z88.2	<input type="checkbox"/> Illumination, 29 CFR 1910.120 (m)
<input checked="" type="checkbox"/> Drilling Safety	<input type="checkbox"/> Sanitation, 29 CFR 1910.120 (n)
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

ATTACHMENT A
CHEMICAL CONTAMINANTS DATA SHEETS
FORM 25

HEALTH AND SAFETY EVALUATION- 1 CHEMICAL HAZARDS-FORM 25

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
Trichloroethylene	<input type="checkbox"/> Explosive	<input type="checkbox"/> Solid	<input type="checkbox"/> Solid	pH: N/A	<input checked="" type="checkbox"/> CA 1000 ppm	<input checked="" type="checkbox"/> Inhalation	<input type="checkbox"/> HNu
Tasks 1,2,3	<input type="checkbox"/> Flammable	<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Liquid	FP:N/A	<input checked="" type="checkbox"/> PEL	<input checked="" type="checkbox"/> Ingestion	<input type="checkbox"/> 11.7 eV
	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Gas	<input type="checkbox"/> Gas	LEL: 8%	<input type="checkbox"/> TLV _____	<input checked="" type="checkbox"/> Skin Absorption	<input type="checkbox"/> 10.2 eV
	<input type="checkbox"/> Reactive			UEL: 10.5%	<input checked="" type="checkbox"/> IDLH 1000 ppm	<input checked="" type="checkbox"/> Contact (liquid)	<input checked="" type="checkbox"/> OVM
	<input type="checkbox"/> Water Reactive			Auto. lg.: N/A	<input type="checkbox"/> Only toxicological data available	<input type="checkbox"/> Direct Penetration	<input type="checkbox"/> 10.0/10.6 eV
	<input type="checkbox"/> Oxidizer			BP: 189°F	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input checked="" type="checkbox"/> 11.8 eV
CAS No:	<input type="checkbox"/> Radioactive	Incompatible With:	MP: N/A				<input type="checkbox"/> CGI
79-01-6	<input checked="" type="checkbox"/> Other Noncombustible liquid, but decomposes in a fire to hydrogen chloride and phosgene	Strong caustics and alkalis, chemically active metals.	Sp. Gr.: 1.46				<input type="checkbox"/> OVA
Synonyms:			Vap. D.: 5.2 mm Hg			Symptoms:	<input type="checkbox"/> _____
Ethylene trichloride, trichloroethene, TCE			Vap. P.: 15.8 mm Hg			Headache, excitement, fatigue, nausea, vomiting, stupor, and coma.	
			H ₂ O Sol.: Nearly insoluble MW: 165.81			Target Organs: Kidneys, central nervous system, liver.	IP: 9.32 eV

HEALTH AND SAFETY EVALUATION- 1 CHEMICAL HAZARDS-FORM 25

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
Vinyl Chloride	<input type="checkbox"/> Explosive	<input type="checkbox"/> Solid	<input type="checkbox"/> Solid	pH: N/A	<input type="checkbox"/> CA	<input checked="" type="checkbox"/> Inhalation	<input type="checkbox"/> HNu
Tasks 1,2,3	<input checked="" type="checkbox"/> Flammable	<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Liquid	FP: N/A	<input checked="" type="checkbox"/> PEL 1 ppm	<input type="checkbox"/> Ingestion	<input type="checkbox"/> 11.7 eV
	<input type="checkbox"/> Corrosive	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Gas	LEL: 3.6%	<input type="checkbox"/> TLV	<input type="checkbox"/> Skin Absorption	<input type="checkbox"/> 10.2 eV
	<input type="checkbox"/> Reactive			UEL: 33%	<input type="checkbox"/> IDLH	<input checked="" type="checkbox"/> Contact	<input type="checkbox"/> OVM
	<input type="checkbox"/> Water Reactive			Auto. lg.: N/A	<input type="checkbox"/> Only toxicological data available	<input type="checkbox"/> Direct Penetration	<input type="checkbox"/> 10.0/10.6 eV
	<input type="checkbox"/> Oxidizer			BP: 7 °F	<input type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> 11.8 eV
CAS No:	<input type="checkbox"/> Radioactive	Incompatible with:		MP: N/A			<input type="checkbox"/> CGI
75-01-4	<input checked="" type="checkbox"/> Other	Copper, oxidizers, aluminum, peroxides, iron, steel.		Sp. Gr.: N/A			<input type="checkbox"/> OVA
Synonyms:				Vap. D.: N/A		Symptoms:	<input type="checkbox"/> _____
VC, Chloroethene, Chloroethylene, Ethylene monochloride,	Colorless gas or liquid (below 7°F) with a pleasant odor at high temperatures			Vap. P.: 3.3 atm		Weakness, exhaustion; abdominal pain; gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite	
Monochloroethene, Monochloroethylene				H ₂ O Sol (77°F): 0.1%		Target Organs: Liver, central nervous system, blood, respiratory system	IP: 9.99 eV
				Other: MW 62.5			

HEALTH AND SAFETY EVALUATION - 1 CHEMICAL HAZARDS-FORM 25

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
Vinyl Acetate	<input type="checkbox"/> Explosive	<input type="checkbox"/> Solid	<input type="checkbox"/> Solid	pH: N/A	<input type="checkbox"/> CA	<input checked="" type="checkbox"/> Inhalation	<input type="checkbox"/> HNu
Tasks 1,2,3	<input checked="" type="checkbox"/> Flammable	<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Liquid	FP: 18°F	<input type="checkbox"/> PEL	<input checked="" type="checkbox"/> Ingestion	<input type="checkbox"/> 11.7 eV
	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Gas	<input type="checkbox"/> Gas	LEL: 2.6%	<input type="checkbox"/> TLV	<input type="checkbox"/> Skin Absorption	<input type="checkbox"/> 10.2 eV
	<input type="checkbox"/> Reactive			UEL: 13.4%	<input type="checkbox"/> IDLH	<input checked="" type="checkbox"/> Contact	<input type="checkbox"/> OVM
	<input type="checkbox"/> Water Reactive			Auto. lg.: N/A	<input type="checkbox"/> Only toxicological data available	<input type="checkbox"/> Direct Penetration	<input type="checkbox"/> 10.0/10.6 eV
	<input type="checkbox"/> Oxidizer			BP: 162 °F	<input checked="" type="checkbox"/> Other:	<input type="checkbox"/> Other:	<input type="checkbox"/> 11.8 eV
CAS No: 108-05-4	<input type="checkbox"/> Radioactive	Incompatible With: Acids, bases, silica gel, alumina, oxidizers, azo compounds, ozone.		MP:	NIOSH REL: C 4 ppm		<input type="checkbox"/> CGI
	<input checked="" type="checkbox"/> Other			Sp. Gr.: 0.93			<input type="checkbox"/> OVA
Synonyms: 1-Acetoxyethylene, Ethenyl acetate, Ethenyl ethanoate, VAC, Vinyl ethanoate	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			Vap. D.: N/A		Symptoms: Irritation eyes, skin, nose, throat, hoarseness, cough; loss of smell; eye burns, skin blisters	<input type="checkbox"/> _____
	Colorless liquid with a pleasant, fruity odor.			Vap. P.: 83 mmHg		Target Organs: Eyes, skin, respiratory system	
				H ₂ O Sol.: 2%			IP: 9.19 eV
				Other: MW: 86.1			

ATTACHMENT B

MATERIAL SAFETY DATA SHEETS

FORM 26

**MATERIAL SAFETY DATA SHEET****PRODUCT NAME: ISOBUTYLENE****1. Chemical Product and Company Identification**

BOC Gases,
Division of
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974

BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (908) 464-8100**24-HOUR EMERGENCY TELEPHONE NUMBER:**
CHEMTREC (800) 424-9300**TELEPHONE NUMBER:** (905) 501-1700**24-HOUR EMERGENCY TELEPHONE NUMBER:**
(905) 501-0802**EMERGENCY RESPONSE PLAN NO:** 20101**PRODUCT NAME:** ISOBUTYLENE**CHEMICAL NAME:** Isobutylene**COMMON NAMES/SYNONYMS:** 2-Methylpropene, Isobutene**TDG (Canada) CLASSIFICATION:** 2.1**WHMIS CLASSIFICATION:** A, B1, D2B**PREPARED BY:** Loss Control (908)464-8100/(905)501-1700**PREPARATION DATE:** 6/1/95**REVIEW DATES:** 6/7/96**2. Composition, Information on Ingredients**

INGREDIENT	% VOLUME	PEL-OSHA ¹	TLV-ACGIH ²	LD ₅₀ or LC ₅₀ Route/Species
Isobutylene FORMULA: C ₄ H ₈ CAS: 115-11-7 RTECS #: UD0890000	99.0 to 99.8	Simple Asphyxiant	Simple Asphyxiant	LC ₅₀ 620 mg/m ³ /3H (rat)

¹ As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)² As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents**3. Hazards Identification****EMERGENCY OVERVIEW**

This product does not contain oxygen and may cause asphyxia if released in a confined area. Simple hydrocarbons can cause irritation and central nervous system depression at high concentrations. flammable.

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
---------------------	-----------------------	--------------------	-------------------	-----------------

PRODUCT NAME: ISOBUTYLENE

HEALTH EFFECTS:

Exposure Limits No	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:

Irritation may occur.

SKIN EFFECTS:

None anticipated as product is a gas at room temperature.

INGESTION EFFECTS:

Ingestion is unlikely.

INHALATION EFFECTS:

Product is relatively nontoxic. Simple hydrocarbons can irritate the eyes, mucous membranes and respiratory system at high concentrations.

Inhalation of high concentrations may cause dizziness, disorientation, incoordination, narcosis, nausea or narcotic effects.

This product may displace oxygen if released in a confined space. Maintain oxygen levels above 19.5% at sea level to prevent asphyxiation.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

NFPA HAZARD CODES

Health: 1
Flammability: 4
Reactivity: 0

HMIS HAZARD CODES

Health: 1
Flammability: 4
Reactivity: 0

RATINGS SYSTEM

0 = No Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard

4. First Aid Measures

EYES:

Never introduce oil or ointment into the eyes without medical advice! If pain is present, refer the victim to an ophthalmologist for further treatment and follow up.

SKIN:

MSDS: G-53

Revised: 6/7/96

PRODUCT NAME: ISOBUTYLENE

Remove contaminated clothing and wash affected area with soap and water. If irritation persists, seek medical attention.

INGESTION:

Not normally required. Seek immediate medical attention.

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted (artificial) respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. Fire Fighting Measures

Conditions of Flammability: Flammable liquid and vapor		
Flash point: -105 °F (-76 °C)	Method: Closed Cup	Autoignition Temperature: 869 °F (465 °C)
LEL(%): 1.8	UEL(%): 9.6	
Hazardous combustion products: Carbon monoxide, Carbon dioxide		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

FIRE AND EXPLOSION HAZARDS:

Isobutylene is heavier than air and may travel a considerable distance to an ignition source. Isobutylene is a flammable gas! Keep away from open flame and other sources of ignition. Do not allow smoking in storage areas or when handling.

EXTINGUISHING MEDIA:

Water, carbon dioxide, dry chemical.

FIRE FIGHTING INSTRUCTIONS:

If possible, stop the flow of gas with a remote valve. Use water spray to cool fire exposed containers. If fire is extinguished and flow of gas is continued, increase ventilation to prevent a build up of a flammable/ explosive atmosphere. Extinguish sources of ignition.

Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above the liquid level with remote monitors. Limit the number of personnel in proximity to the fire. Evacuate surrounding areas to at least 3000 feet in all directions.

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. Increase ventilation to prevent build up of a flammable/explosive atmosphere. Extinguish all sources of ignition! If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location

PRODUCT NAME: ISOBUTYLENE

7. Handling and Storage

Earth bond and ground all lines and equipment associated with the product system. Electrical equipment should be non-sparking and explosion proof.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time.

Post "No Smoking" signs in storage or use areas.

For additional recommendations consult Compressed Gas Association Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Isobutylene FORMULA: C ₄ H ₈ CAS: 115-11-7 RTECS #: UD0890000	99.0 to 99.8	Simple Asphyxiant	Simple Asphyxiant	LC ₅₀ 620 mg/m ³ /3H (rat)

¹ Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

³ As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

ENGINEERING CONTROLS:

Use local exhaust to prevent accumulation. Use general ventilation to prevent build up of flammable concentrations. May use hood with forced ventilation when handling small quantities. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

EYE/FACE PROTECTION:

Safety goggles or glasses.

SKIN PROTECTION:

Protective gloves made of plastic or rubber.

PRODUCT NAME: ISOBUTYLENE**RESPIRATORY PROTECTION:**

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:

Safety shoes, safety shower, eyewash.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70°F	: 39	psia
Vapor density at STP (Air = 1)	: 1.98	
Evaporation point	: Not Available	
Boiling point	: 19.5	°F
	: -6.9	°C
Freezing point	: -220.6	°F
	: -140.3	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Insoluble	
Odor threshold	: Not Available	
Odor and appearance	: A colorless gas with an unpleasant odor similar to that of burning coal.	

10. Stability and Reactivity**STABILITY:**

Stable

CONDITIONS TO AVOID (STABILITY):

None

INCOMPATIBLE MATERIALS:

Oxidizers.

PRODUCT NAME: ISOBUTYLENE

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon monoxide

11. Toxicological Information

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

No chronic effects data given in the Registry of Toxic Effects of Chemical Substances (RTECS) or Sax, Dangerous Properties of Industrial Materials, 7th ed.

12. Ecological Information

No data given.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Isobutylene	Isobutylene
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1055	UN 1055
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

15. Regulatory Information

Isobutylene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Fire Hazard

Sudden Release of Pressure Hazard

16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

MSDS: G-53

Revised: 6/7/96

PRODUCT NAME: ISOBUTYLENE

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Material Data Safety Sheet (MSDS): HYDROCHLORIC ACID

<u>1. Product Identification</u>	<u>7. Handling and Storage</u>
<u>2. Composition</u>	<u>8. Exposure Controls/Personal Protection</u>
<u>3. Hazards Identification</u>	<u>9. Physical and Chemical Properties</u>
<u>4. First Aid Measures</u>	<u>10. Stability and Reactivity</u>
<u>5. Fire Fighting Measures</u>	<u>11. Toxicological Information</u>
<u>6. Accidental Release Measures</u>	<u>12. Ecological Information</u>
	<u>13. Disposal Considerations</u>
	<u>16. Other Information</u>

Note: This information sheet has been re-formatted for better clarity by the Department of Earth Sciences.

Some of the data such as information on shipping and weapons treaties were intentionally left out. If you want to look at the complete MSDS, you can either check one of the hardcopy versions in the Department, contact the manufacturer, or check one of the various Web-based databases such as those compiled by BU's Office of Environmental Health & Safety (www.bu.edu/ehs/msds/index.htm).

[Return to MSDS Index](#)

1. Product Identification

MSDS Name: Hydrochloric Acid, Reagent ACS

Chlorohydric acid, hydrogen chloride, muriatic acid, spirits of salt.

Company Identification: Acros Organics N.V.

One Reagent Lane

Fairlawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

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2. Composition/Information on Ingredients

CAS#	Chemical Name	%	EINECS#
7647-01-0	Hydrochloric acid, reagent ACS	37%	231-595-7
7732-18-5	Water	Balance	231-791-2

Hazard Symbols: C

Risk Phrases: 34 37

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3. Hazards Identification**Emergency Overview**
-----**EMERGENCY OVERVIEW**

Appearance: Clear, colorless to faintly yellow.

Danger! Corrosive. Sensitizer. Causes eye and skin burns. May cause severe

respiratory and digestive tract irritation with possible burns.

Target Organs: None.

Potential Health Effects

Eye:

May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitization to light. May cause conjunctivitis.

Skin:

May be absorbed through the skin in harmful amounts. Contact with liquid is corrosive and causes severe burns and ulceration. May cause photosensitization in certain individuals.

Ingestion:

May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.

Inhalation:

Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. May cause pulmonary edema and severe respiratory disturbances.

Chronic:

Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause conjunctivitis and photosensitization.

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4. First Aid Measures

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.

Skin:

Get medical aid. Rinse area with large amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.

Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Treat symptomatically and supportively.

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5. Fire Fighting Measures

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool.

Extinguishing Media:

Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Autoignition Temperature: Not available.

Flash Point: Not available.

NFPA Rating: Not published.

Explosion Limits, Lower: Not available.

Upper: Not available.

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6. Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Large spills may be neutralized with dilute alkaline solutions of soda ash, or lime. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite.

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7. Handling and Storage

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not get on skin or in eyes. Do not ingest or inhale.

Storage:

Keep away from heat and flame. Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances.

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8. Exposure Controls/Personal Protection

Engineering Controls:

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name ACGIH NIOSH OSHA - Final PELs

Hydrochloric acid, reagent ACS C 5 ppm; C 7.5 mg/m³ 50 ppm IDLH C 5 ppm; C 7 mg/m³

OSHA Vacated PELs:

Hydrochloric acid, reagent ACS:

No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

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9. Physical and Chemical Properties (Hydrochloric Acid)

Appearance:	Clear, colorless to faintly yellow liquid
Odor:	Strong, pungent
Solubility:	823g/L water at 32F
Density:	1.16-1.19
pH:	1.1 (0.1N sol)
% Volatiles by volume	

@ 21C (70F):	Not available
Boiling Point:	230 deg F
Melting Point:	-101 deg F
Vapor Density (Air=1):	1.257
Vapor Pressure:	160 mm Hg
Evaporation Rate (Butyl acetate =1):	2.0

Molecular Formula: HCl

Molecular Weight: 36.46

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10. Stability and Reactivity

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

Incompatible materials, light.

Incompatibilities with Other Materials:

Acetate, acetic anhydride, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, calcium phosphide, cesium acetylene carbide, cesium carbide, chlorosulfonic acid, 1,1-difluoroethylene, ethylene diamine, ethyleneimine, fluorine, lithium silicide, magnesium boride, mercuric sulfate, oleum, perchloric acid, potassium permanganate, b-propiolactone, propylene oxide, rubidum acetylene carbide, rubidum carbide, silver perchlorate + carbon tetrachloride, sodium, sodium hydroxide, sulfuric acid, uranium phosphide, vinyl acetate. Substance polymerizes on contact with aldehydes or epoxides.

Hazardous Decomposition Products:

Hydrogen chloride, chlorine, carbon monoxide, carbon dioxide, hydrogen gas.

Hazardous Polymerization: May occur.

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11. Toxicological Information

RTECS#:

CAS# 7647-01-0: MW4025000

CAS# 7732-18-5: ZC0110000

LD50/LC50:

CAS# 7647-01-0: Inhalation, mouse: LC50 = 1108 ppm/1H; Inhalation, rat: LC50 = 3124 ppm/1H; Oral, rabbit: LD50 = 900 mg/kg.

CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg.

Carcinogenicity:

Hydrochloric acid, reagent ACS -

IARC: Group 3 carcinogen

Epidemiology:

No information available.

Teratogenicity:

Embryo or Fetus: Stunted fetus, ihl-rat TCLo=450 mg/m³/1H Specific

Developmental Abnormalities: homeostasis, ihl-rat TCLo=450 mg/m³/1H.

Reproductive Effects:

No information available.

Neurotoxicity:

No information available.

Mutagenicity:

No information available.

Other Studies:

None.

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12. Ecological Information

Ecotoxicity:

Trout LC100=10 mg/L/24H Shrimp LC50=100-330 ppm Starfish LC50=100-330mg/L/48H Shore crab LC50=240 mg/L/48H Chronic plant toxicity=100 ppm

Environmental Fate:

Substance will neutralize soil carbonate-based components.

Physical/Chemical:

No information available.

Other:

None.

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13. Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

RCRA D-Series Maximum Concentration of Contaminants: None listed.

RCRA D-Series Chronic Toxicity Reference Levels: None listed.

RCRA F-Series: None listed.

RCRA P-Series: None listed.

RCRA U-Series: None listed

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16. Other Information

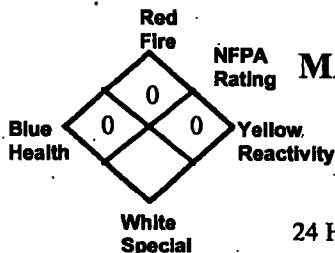
MSDS Creation Date: 11/09/1995 Revision #4 Date: 4/28/1998

The information above is believed to be accurate and represents the best

information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

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Alconox®**MATERIAL SAFETY DATA SHEET**

Alconox, Inc.
30 Glenn Street
White Plains, NY 10603

24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 2001
Chemical Family:	Anionic Powdered Detergent
Manufacturer Catalog Numbers for sizes	1104, 1125, 1150, 1101, 1103 and 1112

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.
pH:	9.5 (1%)

IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO ₂ , foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO ₂ on burning

ALCONOX MSDS - ALCONOX MSDS - ALCONOX MSDS - ALCONOX MSDS - ALCONOX MSDS
VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

ATTACHMENT C

SAFETY PROCEDURES/FIELD OPERATING PROCEDURES

(FLD OPS)

FLD 01 OCCUPATIONAL NOISE AND HEARING CONSERVATION

(Final revision 11/8/1999)

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GENERAL

Noise is defined as unwanted sound. Noise can cause sudden traumatic temporary or permanent hearing loss, long term slowly occurring sensory-neural and irreversible hearing loss, disruption of communication, and masking of warning devices and alarms. Increased stress levels and effects on the cardiovascular and nervous systems have been documented as additional concerns.

The goal of this operating practice is to reduce and potentially eliminate hazardous levels of noise exposure.

REFERENCES

29 CFR 1910.95

RESPONSIBILITIES

Project Manager or Supervisor: The Project Manager or employee's supervisor shall ensure that WESTON and subcontract personnel under their control comply with the requirements of this procedure and have the necessary resources to assure compliance. The Project Manager or Supervisor will ensure that hazard assessment, monitoring and control procedures have been implemented.

Safety Officer: The safety officer (site, project or region) shall assist the Project Manager or Supervisor in understanding the technical requirements of this practice.

The Corporate Health and Safety (CHS) Director: The CHS Director or his designees (e.g., safety professionals, safety officers, division safety managers, or operations health and safety group) will provide assistance with interpretations of this practice. The CHS Director will ensure periodic evaluation of this operating practice through practice review and inspections.

Occupational Medical Provider (OMP): WESTON's OMP will assist in compliance with this practice through evaluation of clinics, verification of baseline exams and annual employee audiogram evaluation. The OMP will advise the Safety Officer and, if necessary, the CHS Director of any problems associated with medical compliance or occupationally related hearing loss in workers.

Employees: All affected employees are responsible for complying with the requirements of this practice. Any concerns or questions regarding compliance is to be brought the attention of the Safety Officer, the Project Manager, or the Supervisor.

Revised 11/1999

Recognition and Risk Assessment

Employee noise exposure is expressed as an eight-hour time-weighted average (full shift exposure) in decibels (dB) on the "A-scale" (dBA). This number is to be compared to the Occupational Safety and Health Administration's Permissible Exposure Limit (PEL) which is an 8-hour time-weighted average (TWA) of 90 dBA, and the OSHA Action Level (AL) which is 85 dBA. Table G-16 in 29 CFR 1910.95 provides information regarding time-equivalent PELs.

The PEL is a limit which should not be exceeded, and the AL is a noise level threshold which when exceeded obligates the employer to establish a Hearing Conservation Program (HCP). The HCP includes baseline and annual hearing tests, and hearing conservation training. Whenever there is a reasonable possibility of employee noise exposure over 85 decibels, the affected employee is enrolled in the HCP.

The need for noise monitoring equipment, noise dosimeters or hearing protection devices must be addressed in the planning stages of a project. WESTON personnel and WESTON subcontractors are to wear hearing protection devices when required and where signs are posted requiring their use.

Some of the sources of noise at hazardous materials sites, demolition operations, construction and industrial sites which can cause hearing damage are: compressor motors, drill rig engines, hammer blows (such as from a split spoon), compressor motors, compressed air, and heavy equipment. Examples of approximate noise levels from various activities are as follows:

- Rock Drilling: up to 115 dBA
- Chain Saws: up to 125 dBA
- Abrasive Blasting: up to 110 dBA
- Heavy Equipment: 95 to 110 dBA
- Demolition: up to 117 dBA
- Needle Guns: up to 112 dBA
- Riveter/Chipper: up to 120 dBA
- Noisy Factory: up to 90 dBA
- Noisy Office: 70 to 80 dBA
- Conversational Speech: 60 dBA

Noise Evaluation and Surveillance Procedures

Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment. If the HASP or the Safety Officer indicate that the site, or activity, requires an instrumentation survey then the area will be screened with an A-weighted sound level meter (Area Monitoring). If deemed necessary a more in depth evaluation utilizing a noise dosimeter may be performed (Personnel Monitoring). Both types of monitoring, if needed, will be accomplished in accordance with requirements established in 29 CFR 1910.95(d).

Revised 11/1999

Long-term work efforts at fixed locations (e.g., water treatment plants, incinerators, etc.) will require an evaluation of noise levels utilizing instrumentation. Re-monitoring may be necessary when changes in equipment, processes or activities result in modification of the noise level.

If impact noise is present, the peak noise levels and the frequency of the impacts should be determined. Both OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend certain limits to impact noise which depend on the noise intensity and frequency of the impacts. These resources and/or qualified personnel should be consulted if questions arise regarding impact or impulse noise.

Noise Control Methods

Engineering Controls

The primary means of reducing or eliminating personnel exposure to hazardous noise is through engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the sound transmission path that will reduce the noise level to the employees ear. Engineering controls include items such as; mufflers on heavy equipment or motors, sound baffles, and enclosures.

Administrative Controls

Administrative controls are defined as changes in the work schedule or operations which reduce noise exposure. These controls include increasing worker distance from the noise source and rotation of jobs so that time limits of exposure are reduced.

Administrative time control is not a preferable method for preventing noise exposure since extreme noise for a short duration can cause severe, permanent hearing loss. Administrative controls may be utilized in accordance with the TWA Tables (see 29 CFR 1910.95, Table G-16). Administrative controls may not be utilized for exposures greater than 115 dBA, regardless of the exposure time.

Hearing Protection

Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 85 dBA for employees with standard threshold shifts and below 90 dBA for all other employees.

Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The eight hour average may equal or exceed 90 decibels.
- Any employee exposed to greater than or equal to 85 decibels and who have experienced a standard threshold shift (STS) in their hearing.
- Any noise equal to greater than 115 decibels impact, continuous or intermittent.
- Anywhere a "HEARING PROTECTION REQUIRED" sign is posted. These signs are to be posted in all mandatory situations listed above.

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In the absence of sound level measuring instrumentation, any noise preventing normal vocal discussion between two individuals at arms length distance ("arms-length rule") will dictate the need for hearing protection. WESTON guidelines require the use of hearing protection on an immediate basis under the "arms-length rule". Exceptions may be granted based upon task and duration.

Not all hearing protection devices have the same noise reduction rating (NRR). Verification of all NNR values must be made by referring to the manufacturers' specifications.

The proper hearing protection is selected using results from a properly calibrated sound level meter in the following manner. The NRR of the device chosen is reduced by subtracting. Then this resulting number is subtracted from the noise level in dBA (for example: if the noise reading is 100 dBA, and the ear plugs selected have a NRR of 27. Subtracting 7 from 27 equals 20. Subtracting 20 from 100 equals 80. The attenuated sound level to the wearer is 80). Appendix B of 29 CFR 1910.95 provides information on attenuation adequacy using other monitoring devices or scales.

Hearing protection must attenuate employee exposure to an 8-hour TWA of 90 dBA or less. WESTON will strive to accomplish an attenuation of 85 dBA or less. For any employee diagnosed with a standard threshold shift, the attenuation must be 85 dBA or less.

Additional information regarding the selection, use, maintenance, and control of hearing protection devices is provided in the WESTON Personnel Protective Equipment Program.

Medical Surveillance

Compliance with the Hearing Conservation Program (HCP) component of 29 CFR 1910.95 is required whenever an employee's exposure to noise in excess of 85 dBA occurs. As such, field employees whose job descriptions require work with drill rigs, heavy construction equipment or noisy client operations would be candidates for the HCP and medical surveillance requirements thereof. Supervisors of any employees not meeting the categories above (e.g., treatment plant operations, print shop, maintenance personnel) are required to determine the need for those employees to participate in the HCP by performing noise surveys, and advise their safety officer who will in turn notify the Occupational Medical Provider.

WESTON's Occupational Medical Provider will make the final determination of employee involvement in the medical surveillance component of the HCP.

Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8 hour TWA exposures of 85 dBA or greater (including compliance with the "arms-length rule"). By evaluating the hearing of these individuals, the overall effectiveness of the Occupational Noise and Hearing Conservation Program can be systematically monitored. WESTON's Occupational Medical Provider is responsible for assuring local clinic compliance with the audiometric testing component of the standard.

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Training

Initial and annual training shall be given to each employee included in the Hearing Conservation Program. Training will address the following:

The effects of noise on hearing.

- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- The purpose of audiometric tests and explanation of test procedures.
- Recognition of hazardous noise.

WESTON's initial and refresher courses under 29 CFR 1910.120 (Hazardous Waste) are utilized to deliver these training obligations. Alternative training will be given to employees who are included in the HCP but who are not trained in accordance with Hazardous Waste requirements.

Program Evaluation

Periodic program evaluations will be conducted to assess compliance with 29 CFR 1910.95 and this operating practice. The CHS Director (or his designee) is responsible for reviewing this practice on an annual basis. WESTON's Occupational Medical Provider is responsible for assisting in this evaluation by providing information relative to employee exposure and medical surveillance data.

Recordkeeping

Employee exposure measurements are retained for a minimum of two years and audiometric test records are retained for the duration of the employee's employment, plus thirty years.

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FLD 05 HEAT STRESS PREVENTION AND MONITORING

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GENERAL

Heat stress may occur at any time work is performed at elevated temperatures. Wearing chemical protective clothing often decreases natural body heat loss and increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, with symptoms ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration or dexterity) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventive measures are vital to ensure worker safety.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments.

REFERENCES

OSHA 29 CFR 1910 and 1926

Related FLD OPS:

FLD02 – Inclement Weather

FLD03 – Hot Processes – Steam

FLD08 – Confined Space Entry

FLD36 – Welding, Cutting and Burning

FLD37 – Pressure Washing

APPENDICES

A Common Heat Stress Disorders and Their Prevention and Treatment

PROCEDURE

Recognition and Risk Assessment

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur.

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The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Four common heat stress disorders and their associated prevention and treatment methods are provided in Appendix A.

Prevention and Protection Programs

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventive heat stress management such as the examples given below.

Have workers drink 16 ounces of water before beginning work, at established breaks, and in the morning or after lunch. The body's normal thirst mechanism is not sensitive enough to ensure body fluid replacement, therefore, pre- and post-work fluid intake is necessary. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. In order to prevent heat stress symptoms, the individual must ensure replacement of this moisture.

Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Have workers drink 16 ounces of water before beginning work, and a cup or two at each break period. Provide a shaded area for rest breaks. Discourage the intake of caffeinated drinks during working hours. Monitor for signs of heat stress.

Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level. The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water.

If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.

Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin work activities with extremely demanding tasks. Rotate shifts of workers who are required to wear impervious clothing in hot weather. In extremely hot weather, conduct field activities in the early morning and evening.

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Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

Ensure that adequate shelter is available to protect personnel against heat and direct sunlight, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up the command post in the shade.

Good hygienic standards must be maintained by frequent showering and changes of clothing. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division safety manager, safety officer) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before personal protective equipment (PPE) is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale, however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

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Note: For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

Measure the air temperature with a standard thermometer.

Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).

Calculate the adjusted temperature based on the following formula:

Adjusted Temperature = Actual Temperature + 13 X
(fraction of the percent sunshine factor)

Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature). For example, site personnel anticipate wearing level C (impermeable clothing) during site activities.

The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x fraction of the percent sunshine factor).

Adj T °F = 80°F + (13 x 1.0)

Adj T °F = 93°F

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 60 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

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TABLE 1

**PERCENT SUNSHINE FACTORS
HEAT STRESS PREVENTION AND MONITORING**

Percent Sunshine (%)	Cloud Cover	Sunshine fraction
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

TABLE 2

**PHYSIOLOGICAL MONITORING SCHEDULE
HEAT STRESS PREVENTION AND MONITORING**

Adjusted Temperature	Level D (Permeable clothing)	Level C, B, or A (Nonpermeable clothing)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8°C)-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°F (28.1°C)-32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°F (25.3°C)-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°F (22.5°C)-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

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APPENDIX A

COMMON HEAT STRESS DISORDERS AND THEIR PREVENTION AND TREATMENT

Heat Rash

Heat rash is caused by continuous exposure to heat and humidity, and is aggravated by chafing clothes. The condition decreases an individual's ability to tolerate heat and can be extremely uncomfortable.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing.

Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water, however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of lightly salted water or diluted commercial electrolyte solution immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery (e.g., Gatorade, Quench) however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms – Pale, clammy, and moist skin, profuse perspiration, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may feel dizzy.

Treatment – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician, especially in severe cases. Have the victim drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

Symptoms – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, unconsciousness or coma.

Treatment – Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Soak the victim in cool (not cold) water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (less than 102°F). Monitor the victim's vital signs and obtain immediate medical help. Do not give the victim coffee, tea, or alcoholic beverages.

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GENERAL

PROCEDURE

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury.

Cuts, Pinching, and Crushing

Splinters, slivers, and sharp edges on objects to be lifted can result in cuts. Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings).

Muscle and Joint Injuries

Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted.

Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

Recognition and Hazard Assessment

The need for manual lifting must be identified as a physical hazard when project tasks specifically require manual handling or use of heavy equipment, and the following safe lifting techniques must be instituted:

- Plan any lifting task, noting:
 - **Contact hazards.** Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, signs of biological hazards, and chemical or radioactive material contamination.
 - **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
 - **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
 - **Area in which lifting is to be done.** Check for pinch points such as other objects close by and ensure there is room for safe lifting.
 - **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Also consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

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- **Route to be traveled, if lifting includes carrying.** Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

Prevention and Protection Programs

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
 - Determine that the object is within the safe weight limit.
 - Check for contact hazards.
 - Walk the intended route of travel to identify and remove slip and fall hazards.
 - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.
- To lift square or rectangular objects:
 - Avoid reaching as you lift.
 - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
 - Keep objects close to the body.
 - Squat in front of the load.
 - Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
 - Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
 - Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.
 - If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel

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- To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **For odd-shaped objects, the only modification needed should be hand-hold position.** When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel. Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

Manual Handling of Heavy Objects

Hazard

Manual maneuvering or handling of heavy objects without actually lifting is often required for hazardous materials and on Resource Conservation and Recovery Act (RCRA) facilities and construction sites. Manual handling of heavy objects, even when not actually lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

Recognition and Risk Assessment

The need for manual handling of heavy objects must be addressed in the planning stages of a project Health and Safety Plan (HASP). Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not actually involve lifting, workers can handle heavier objects, even those weighing several hundred pounds, safely if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

Prevention and Protection Programs

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible.

Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

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Objects to be manually handled must be checked for contact hazards prior to beginning movement, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55 gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

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FLD 11 ROUGH TERRAIN

GENERAL

REFERENCES

Related FLD OPS:

FLD02 – Inclement Weather

FLD05-Heat Stress

FLD06-Cold Stress

FLD15 – Remote Areas

FLD22-Heavy Equipment Operation

FLD47-Clearing and Grubbing

Hazard

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping. Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles. Heavy or downed vegetation can hide holes or breaks in the terrain, which increase risk of slips, trips, and falls or vehicle accidents.

Recognition and Risk Assessment

Rough terrain complicates work activities and adds or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard. Risk assessment is usually accomplished from site history information (i.e., site topography) and onsite by the Site Health and Safety Coordinator (SHSC).

Hazard Prevention and Protection Programs

Hazard prevention can be achieved by ensuring regular maintenance is performed on vehicles. In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths. The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls. Boots that are ankle high or higher should be worn to provide additional support and stability. Vehicle drivers and passengers should wear seatbelts at all times. 4 wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for 2 wheel drive vehicles by the SHSC.

When clearing and grubbing activities are being conducted, the equipment operator is to be protected by a fully enclosed cab. Chainsaw operators are to wear chaps, hardhat, face/ear and eye protection. Ground personnel should always be alert for snakes and wild animals.

Personnel should maintain a high level of physical conditioning due to increased body stress and exertion. Emergency communications such as a cell phone or two-way radio should be carried at all times. Personnel should be aware of potential hazards and ensure the availability of first aid supplies and knowledge of the location of the nearest medical assistance.

GENERAL

Hazards associated with poor housekeeping include slips, trips, falls, punctures, cuts, and fires.

REFERENCES

Related FLD OPS:

FLD29 – Material Handling

FLD33 – Demolition

FLD39 – Illumination

PROCEDURE

Recognition and Risk Assessment

Good housekeeping is an important element of accident prevention. Good housekeeping should be planned at the beginning of the job and carefully supervised and monitored through to the final clean-up.

Housekeeping requirements must be addressed in the planning stages of a project and safety plan. Risk assessment can be accomplished in the development stages of a project by listing in the site-specific Health and Safety Plan (HASP), good housekeeping requirements and the hazards associated with poor housekeeping (e.g., slips, trips and falls). The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Prevention and Protection Programs

Poor housekeeping can be prevented by following the three steps described below:

1. Plan ahead. A materials storage area which has been planned is more orderly than one which has developed haphazardly.
2. Assign responsibilities. If the size of the job and work force merit, a person should be assigned specific responsibility for clean up. Ideally, each individual should pick up his or her work area and help keep the site neat.
3. Implement the program. Housekeeping must be part of the daily routine, with clean-up being a continuous procedure.

Accidents caused by poor housekeeping can be prevented by adherence to the following rules.

Lunch areas should be kept clear of empty bottles, containers, and papers. Trash disposal cans should be provided. An effective means of preventing litter is the provision of suitable receptacles for hazardous waste, as well as nonhazardous waste.

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Accumulation of flammable and combustible liquids on floors, walls, and other areas, is prohibited. All spills of flammable and combustible liquids must be cleaned up immediately. Combustible waste such as soiled rags and paper is to be stored in a safe place (such as a covered metal container) and disposed of regularly.

WESTON project managers and WESTON subcontractors should provide sufficient personnel and equipment to ensure compliance with all housekeeping requirements.

Work will not be allowed in areas that do not comply with the requirements of this section.

The SHSC and WESTON subcontractors will inspect the work area daily for adequate housekeeping and record unsatisfactory findings on the daily inspection report.

If applicable, the decontamination line must be kept neat and free of debris.

Adequate lighting should be provided in or around all work areas, passageways, stairs, ladders, and other areas used by personnel.

All stairways, passageways, gangways, and accessways shall be kept free of materials, supplies, and obstructions at all times.

Loose or light material should not be stored or left on roofs or floors that are not enclosed, unless it is safely secured.

Tools, materials, extension cords, hoses, or debris are to be used, disposed of, and stored so as not to cause a tripping or other hazard.

Tools, materials, and equipment subject to displacement or falling should be adequately secured.

Empty bags that contained lime, cement, and other dust-producing materials should be removed periodically, as specified by the designated authority.

Protruding nails in scrap boards, planks, and timbers should be removed, hammered in, or bent over flush with the wood, unless placed in containers or trucks for removal.

Walkways, runways, and sidewalks should be kept clear of excavated material or other obstructions and no sidewalks should be undermined unless shored to carry a minimum live load of 125 pounds per square foot.

Containers should be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

When rivet heads are knocked off or backed out, they should be prevented from falling.

Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.

All storage and construction sites should be kept free of the accumulation of combustible materials.

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All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.

Areas prone to weeds and grass should be kept mowed. A standard procedure should be established for cleanup of such areas, as specified by the SHSC.

Rubbish, brush, long grass, or other combustible material must be kept from areas where flammable and combustible liquids are stored, handled, or processed.

FLD 22 EARTH MOVING EQUIPMENT/ MATERIAL HANDLING EQUIPMENT.

REFERENCES

CFR 1926 Paragraphs 600-602

Related FLD OPS:

FLD23 – Cranes/Lifting Equipment

FLD24 – Aerial Lifts/Manlifts

FLD34 – Utilities

FLD35 – Electrical Safety

PROCEDURE

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

Machinery and Mechanized Equipment Safety

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

The employer will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe shall be removed from service and its use prohibited until unsafe conditions have been repaired or corrected.

Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passing or placement of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation.

Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers, J386-1969, Seat Belts for Construction Equipment. Seat belts for agricultural and light industrial tractors shall meet the seat belt requirements of Society of Automotive Engineers J333a-1970, Operator Protection for Agricultural and Light Industrial Tractors.

Seat belts shall be worn when provided by manufacture. . . Passengers shall not be allowed to ride on equipment unless equipment designed with additional seats with safety belts.

Audible alarms. All bi-directional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property; nor will the safe operating speeds or loads be exceeded.

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. The only exemption is equipment designed to be serviced or maintained while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic or other hazards to maintenance personnel.

Machinery and equipment, or parts thereof, that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, front end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be securely mounted and structurally adequate for the weight drawn.

Persons will not be permitted to get between a piece of towing equipment and the item being towed until the towing equipment has come to a complete stop.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set. Equipment such as lift trucks and stackers will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering hand wheel to spin. When permitted, the steering knob will be mounted within the periphery of the wheel.

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in American National Standards Institute (ANSI) B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

Cranes and any other equipment used for lifting must be inspected as required and records of inspection must be maintained.

Drill Rigs

WESTON has adopted the Drilling Safety Guide prepared by the Diamond Core Drilling Manufacturers Association and the National Drilling Contractors Association, as published by the National Drilling Federation, as the basic safety programs for all activities involving drill rigs or similar apparatus for the purpose of well installation or soil borings.

FLD 34 UNDERGROUND UTILITIES

PURPOSE

This Field Operation Procedure (FLD) provides requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities. The FLD also addresses actions to be taken in response to encountering or contacting underground utilities. These requirements are applicable to all Weston Solutions, Inc. (WESTON) operations. The procedures address the requirements and recommendations for identifying and locating, working around, and encountering or contacting underground utilities.

DEFINITIONS

Aggressive Methods

The use of mechanized equipment such as (but not limited to) excavators, backhoes, drill rigs, directional drilling, or road saws.

Buffer Zone

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. WESTON requires the imposition of a **three-foot** Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. Since most jurisdictions recognize Buffer Zones which vary somewhere in the range of 18 to 36 inches, this distance must be verified by consulting the applicable state regulations before excavating so that adjustments to surface markings can be made to achieve the WESTON-required three-foot buffer zone.

Referred to as the "Tolerance Zone", "Safety Zone", or "Approximate Location of Underground Utilities" in some jurisdictions.

Competent Person

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the "One-Call" system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for excavation work and the identification, avoidance, and protection of underground utilities.

The designation of a Competent Person will be made by the Site or Project Manager and documented within the Site-specific Health and Safety Plan (HASP) or attachment to the HASP.

Damage

Any impact to or unanticipated removal of support from, an underground utility as a result of excavation or demolition. Damage may be as simple as minor contact (by any means) resulting in

displacement of protective coating. The utility owner must be contacted regarding any damage or question of damage.

De-Energize

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.

Excavation (Intrusive Activity)

An operation for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to; digging, blasting, augering, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering, pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), fence or sign post installation.

Jurisdiction

The authority having legal jurisdiction relative to regulations and requirements for notification of excavation activities and associated identification and marking. In the United States, the States have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way. Note: One caveat to remember – Jurisdiction may flow to the “owner” on private or government-owned property because the State One-Call Agencies may not clear utilities on such facilities.

Locate

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that *approximately* determines the location of a line or facility.

Locate Request

A communication between an entity performing intrusive activities and a utility marking agency (One-Call, etc).

Non-Aggressive Methods

Non-Aggressive methods involve the use of manual methods such as hand digging with shovels and air/hydro/vacuum methods.

Observer

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within four feet of the outside edge of the buffer zone. This person remains in close communication with the equipment operator(s) and will stop the activity if needed.

One-Call Agency

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public areas. It is important to note that not all underground utility owners are required to join the One-Call system. The Site Manager or Competent Person is responsible to determine additional utilities that may need to be contacted individually.

Positive Response

Verification prior to the intrusive activity, to ensure that all contacted (typically via the One-Call Agency) owner/operators have located and marked the underground utilities.

Potholing

The practice of exposing an underground facility by safe, *non-aggressive* excavation methods in order to determine the precise horizontal and vertical position and orientation of underground lines or utilities.

Underground Utility

An underground or submerged conductor, pipe, or structure used in transporting or providing electric, communications service, gas, oil or oil product, sewage, storm drainage, water or other service and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:

- Natural gas pipelines
- Electric cables
- Water pipelines
- Fiber optic telecommunications lines
- Telephone cable lines
- Steam pipelines
- Gasoline, oil, or other fuels
- Sewer pipelines
- Vents for sewer and gasoline/diesel fueling systems
- Underground Storage Tanks (USTs)
- Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

Underground Utility Owner

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

White Lining

The practice whereby the person (in this case WESTON or a Subcontractor) who intends to perform intrusive activities, pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a practice that does prevent utility contact incidents. Check State or local regulatory requirements to ensure compliance.

RESPONSIBILITIES

Competent Person

The Competent Person shall be responsible for:

- Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
- Contacting the appropriate One-Call Agency or private locating service, as applicable.
- Recording One-Call locate numbers.
- If necessary, renewing One-Call locate numbers before expiration.
- Ensuring that white-lining of the area to be excavated is performed; if another equal or better protective measure is necessary because of the nature of the work, state/local regulation or client requirements, the Health and Safety Plan should be amended to reflect the change.
- Ensuring that a "positive response" has been received from every utility owner/operator identified by the One-Call Agency (and any non-member utility as necessary) and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities prior to the start of intrusive work.
- Completion and maintenance of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
- Reviewing applicable Activity Hazard Analyses (AHAs) with all project members before work begins.
- Conducting training on communication protocols to be used by the excavation observer and equipment operator.
- Ensuring Implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).

- Conducting daily or more frequent (due to changes in conditions) inspections of the excavation area to make sure that all markings are intact.
- Providing the Site Health and Safety Coordinator (SHSC) with all required documentation on a daily basis.

Observer

Whenever intrusive operations with mechanized equipment are being conducted *within three feet of the outside edge of the buffer zone*, horizontally and vertically, an observer must be assigned to monitor the activities. The observer is responsible for:

- Maintaining a safe vantage point relative to digging machinery, excavation edge and proximity to the hazard posed by the utility.
- Observing the operation to ensure that the operator stops operations if utilities are observed.
- Reviewing hand signals and other forms of communication with the operator. Note: hand signals should be as those identified under ANSI, OSHA or the Corps of Engineers for Crane Hand Signals, or another, equally effective and understood system.
- Properly signaling the operator.
- Stopping the operation immediately if the observer's attention must be diverted even momentarily.
- Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
- Maintaining required records, such as logbook entries, or other, as requested by line management.

Line Management

The Project Manager (PM) or Site Manager (SM) shall be responsible for:

- Establishing the site culture with the assistance of the Site Health and Safety Coordinator that ensures compliance with this procedure.
- Providing the necessary resources for compliance with this procedure.
- Designating Competent Personnel prior to the start of work.

Environmental, Health and Safety Personnel

The Site Health and Safety Coordinator (SHSC) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this procedure.
- Consulting with the PM, SM and Competent Person on underground utility issues.
- Acting as the Competent Person or Observer as necessary and qualified.

PROCEDURE

The following sections provide the requirements and recommendations of this procedure, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering or contacting underground utilities during intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.

Identifying and Locating Underground Utilities

The potential for underground utilities or other subsurface feature (e.g., subsurface mines) must be evaluated as early as possible in the planning phase for any project, which involves intrusive activities. The following sections describe various methods for identifying and locating utilities on a site. The *Underground Utilities Locating and Marking Checklist* (Attachment A) and the *Underground Utilities Management Checklist* (Attachment B) must be completed before any activities meeting the definition of excavation are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project.

Note: Attachments A and B or their equivalents must be used to document compliance with this operating procedure and will be subject to audit.

Prior to excavation all underground utilities must be located and identified by at least two of the following:

- ***The Utility Owner***
- ***A Private or Public Utility Locating Service***
- ***Review of the most current utility drawing, maps or other available records by an approved WESTON Competent Person***
- ***Use of utility locating technology by a WESTON Competent Person or Subcontractor***

As an aid in determining the potential for or existence of utilities follow the criteria outlined in Appendix C (Utilities Research Options).

Pre-Planning and the Site HASP

The Site-Specific Health and Safety Plan (HASP) developed for the project must:

- Identify the location and types of underground utilities that are believed to be present on the site.
- Reference this procedure (FLD 34), and describe how it will be implemented on the project.
- Contain an Activity Hazard Analysis in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
- Contain any site or contract-specific requirements (e.g., Corps of Engineers, EM 385-1-1, Section 25) that may be applicable.
- Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.
- Address underground utilities and potential associated scenarios in the emergency response section of the HASP.

"One-Call" Locating and Marking Services

Every state has utility marking service programs having various names such as "One-Call", "Dig-Safe", "Call-Before-You-Dig", "Dig-Safely", and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call Agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead-time for the Agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the *"Call-Before-You-Dig Call Center Directory"*, which can be accessed on the Internet at the WebPage (<http://underspace.com/index.htm>) sponsored by *"Underground Focus"* magazine.
- Once notified, the One-Call Agency will provide the contractor with a unique "locate number" or "reference number". This reference number must be kept in the project files by the Competent Person or designee. Additionally, the reference numbers have expiration dates, which may vary depending on the particular One-Call Agency. The valid period of the locate number and required renew notification date shall be requested from the One-Call Agency.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to "work under our locate number". Subcontractors to WESTON may excavate under the locate number secured by WESTON, provided that they are excavating within the area which was

previously white-lined by WESTON and subsequently marked. However, the One-Call Agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number. If a WESTON subcontractor will be excavating in an area not white-lined by WESTON, then the WESTON subcontractor must request a new locate. Note: State and local requirements must be checked for local application of this procedure.

- The area where work is to be performed shall be white-lined by WESTON personnel before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.
- The One-Call Agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded. Note that all utility owners are members of the One-Call system. This does not eliminate the need to contact a non-member owner if you have knowledge or suspect that excavation will impact their utility.
- The utility owners should provide a "positive response" relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark its underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.
- The positive responses shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and crosschecked with the list of utility owners that the One-Call Agency stated that they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call Agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call Agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners should be documented by WESTON using a still, digital, or video camera, whenever practical and reasonable. The photo-documentation shall be maintained with the project files.
- The markings placed by the utility owners or marking services shall follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

American Public Works Association Uniform Color Code

Red		Electric Power Lines, Cables, Conduit
Orange		Communications, Telephone, Cable TV
Yellow		Gas, Oil, Steam, Petroleum or Gaseous Materials
Green		Sewers and Drains
Blue		Potable Water Systems
Purple		Reclaimed Water, Irrigation, Slurry Lines
Pink		Temporary Survey Markings
White		Proposed Excavation

Note: Unless otherwise specified in the utility clearance, such clearance will not be considered valid after 30 days from the date it was issued.

Private Utility Locating and Marking Services

- **One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property.** In the event that activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property (See Appendix C). Additionally, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements within this FLD must be followed. **A list of vendors providing this service can be found in the "Network of Underground Damage Prevention Professionals" which can be accessed on the Internet at the "Underspace" WebPage (<http://underspace.com/index.htm>).**

Self-Performance of Utility Locating and Marking

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services, as previously described are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances on private property or in other areas not served by One-Call agencies (e.g., long-term projects where excavation is a primary task, and the presence of underground utilities is extensive) it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
 - Magnetic field-based locators or path tracers

- Buried electronic marker systems (EMS)
 - Ground penetration radar-based buried –structure detectors
 - Acoustics-based plastic pipe locators
 - Active probes, beacons, or sondes for non-metallic pipes
 - Magnetic polyethylene pipe
- Before self-performing any underground utility locating on a project, approval must be obtained from the appropriate WESTON Division EHS Manager or the Director, Corporate EHS and QA.

Working Near or Around Underground Utilities

After the site has been properly evaluated for the presence of underground utilities, intrusive activities may begin. Since there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

Work Site Review

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

Preservation of Marks

During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call Agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

Excavation Observer

Whenever intrusive operations are being conducted within four feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.

Excavation Within The Buffer Zone

Mechanical means of excavation may not be used within 36 inches (see Buffer Zone) of any marked or suspect utility until the utility has been exposed. Mechanical methods may be used, as necessary, for initial penetration and removal of pavement, rock or other materials requiring use of mechanical means of excavation provided a spotter is used. Once the underground utility has been exposed, further excavation must be performed employing reasonable precautions to avoid damage to the utility, including but not limited to any substantial weakening of structural or lateral support, or penetration or destruction of the utility or its protective coatings. For purposes of this section, "mechanical means of excavation" means excavation using any device or tool powered by an engine except air vacuum or like methods of excavation.

A request to utilize aggressive excavation methods in the buffer zone may be made if:

- There is no other appropriate and reasonable alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (and purged if necessary), verified as de-energized, and locked-out; or
- The depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and
- For utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- Request for the exemption has been submitted to the appropriate Division EHS Manager and approved.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the request for exemption.
- When evaluating the use of aggressive excavation methods in the buffer zone, the Division EHS Manager will consider the type of utility involved and the associated risk potential. Based on this evaluation, the Division EHS Manager may impose further conditions and requirements. Even if the above exemption conditions are met, the Division EHS Manager has authority to deny the request.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. These methods are used in order to prevent mechanical contact with underground utilities, which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
 - Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.
 - If conductive hand tools must be used near electrical lines, then the SHSC and/or Division EHS Manager shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.
- Hydro-excavation (water pressure).
- Air excavation (air pressure).

- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

Protection of Underground Utilities

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.

- When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection must be used as required by OSHA in 29 CFR 1926.651. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:
 - Heavy timbers, similar to swamp or crane mats.
 - Sheets of plywood.
 - Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
 - Timber shoring underneath the utility.
 - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
 - Design by a PE for complicated or large applications.
- Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
 - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept a minimum of two feet from the edge of excavations.
 - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.
 - When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
 - Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.

- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

De-Energizing Utilities

Utilities can carry many types of potential energy, including electricity, flowing liquids, liquids under pressure, or gasses under pressure. A release may happen if a utility conveyance is compromised and could result in personal injury, property damage, and other indirect effects. If the white lines of the proposed excavation area overlaps or extends into the buffer zone of a known underground utility, then if at all possible, that utility should be de-energized to physically prevent the transmission, flow, or release of energy. Conversely, if the buffer zone of the known utility lies outside of the white-lined, proposed excavation area, then de-energizing is not required.

- The owner of the utility shall be contacted to determine the feasibility and methodology of de-energizing the utility. Plenty of lead-time should be provided for this since it may take utility companies weeks to de-energize some utilities.
- Depending on the utility and the material being conveyed, isolation points which may be suitable for de-energizing include but are not limited to the following:
 - Electrical circuit breakers
 - Slide gate
 - Disconnect switches
 - Piping flanges
 - Other similar devices
- When utilities are de-energized, it must be verified by demonstration. This can be accomplished by methods such as, testing equipment, switching on a machine or lighting, or opening a valve. For any current-carrying electrical equipment, such as cables, electrical panels successful de-energizing must be certified through the use of appropriate electrical testing equipment and qualified personnel.
- Whenever a utility is de-energized, a means of ensuring that the energy isolation device and equipment cannot be operated until the device is removed must be provided.
- When de-energizing and locking out of utilities is practiced, the provisions of FLD 42 Lockout/Tagout shall be followed, as applicable.

Damage Discovery

During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine if there is damage: Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection systems.

- The owner of the affected utility must be contacted immediately.
- The One-Call Agency or private location service must be contacted immediately.
- A Notification of Incident (NOI) Report will be used to document such a discovery.

Encountering Unexpected Underground Utilities

It is possible that underground utilities will be encountered in locations that have previously been "cleared" of having underground utilities by the locating service, or are found outside of the area, which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped
- The owner of the affected utility must be immediately contacted.
- The One-Call Agency or private location service must be contacted immediately
- The PM, SM and SHSC must be notified
- No further intrusive activities may be conducted until:
 - The One-Call Agency/private location service and/or the subject utility owner visit the site;
 - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and
 - The orientation and depth of the subject utility has been determined and suitably marked.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.

Contacting Underground Utilities

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped immediately.

- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the HASP.

EXCEPTION: *If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential. Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.*

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the HASP.
- The One-Call Agency or if known, the utility owner must be contacted immediately.
- The PM, SM and SHSC must be notified.
- No further intrusive activities may be conducted until:
 - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
 - The orientation and depth of the subject utility has been determined and suitably marked.
 - Permission from the emergency responders to resume work has been given.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist
 Attachment B – Underground Utilities Management Checklist
 Attachment C – Utilities Research Options
 Attachment D – Sources of Information

FLD 34 UNDERGROUND UTILITIES - ATTACHMENT A
UNDERGROUND UTILITY LOCATING AND MARKING CHECKLIST
Weston Solutions, Inc.

To be Completed by PM and/or "Competent Person"
Complete Form as Location/Marking Progresses and Maintain in Site Files

PROJECT INFORMATION:		Location:
Project Name:		Task/Activity:
WESTON Competent Person:		Start Date of Work:
WESTON Subcontractor: <input type="checkbox"/> No <input type="checkbox"/> Yes:		Private Locating Service Required: <input type="checkbox"/> Yes <input type="checkbox"/> No
Property Owner:		If Not, Explain:
NOTIFICATION:		
Locating Service Name:		Locating Service Tel. Number:
Date Locating Service Notified:		Locate Ticket Number:
Address of Property to be Marked:		Locate Ticket Expiration Date:
Nearest Intersecting Street:		
Are There Any Utilities on the Properties That the Locating Service Will Not Contact? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Specify:		
<i>Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities (See Appendix C).</i>		

TABLE 1

ON-SITE UTILITY INFORMATION

NAME OF UTILITY COMPANY	TYPE OF UTILITY	COLOR CODE	UTILITY PRESENT ON-SITE?	EMERGENCY PHONE NUMBER	DATE MARKS COMPLETED
	Electric	RED			
	Communications, Phone, CATV	ORANGE			
	Gas, Oil, Steam, Petroleum	YELLOW			
	Sewers, Drains	GREEN			
	Potable Water	BLUE			
	Reclaimed Water, Irrigation	PURPLE			
	Temporary Survey Markings	PINK			
To be performed by excavator prior to utility mark-out.	Proposed Excavation	WHITE			

White-Lining Completed? ☐ No Explain: _____ ☐ Yes: Date: _____ By Whom? _____

LOCATING AND MARKING:

Have All Utilities Identified in Table 1 Been Marked? ☐ Yes ☐ No (If Not, Contact Locating Service for Resolution)

Problem(s) With Markings?

☐ Yes ☐ No ☐ No Marks ☐ Incorrect Location ☐ Too Wide
☐ Other: _____ ☐ Not All Utilities Marked Per Table 1 (notify marking service)

Measurements Taken: ☐ Yes ☐ No

Documentation of Marks: ☐ Photos ☐ Video ☐ Other: _____

EXCAVATION:

Utilities Accurately Marked? ☐ Yes ☐ No

If no, describe: _____

Were Unmarked or Mis-Marked Utilities Encountered? ☐ Yes ☐ No

If Yes, Specify: _____

Locating Service Notified? ☐ Yes ☐ No

Will Excavation Continue Past Locate Number Expiration? ☐ Yes ☐ No

If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: _____

Any

Other

Problems/Concerns? _____

Specify: _____

Form Completed By: _____

Signature: _____

Date: _____

**FLD 34 UNDERGROUND UTILITIES - ATTACHMENT B
UNDERGROUND UTILITIES MANAGEMENT CHECKLIST**

Weston Solutions, Inc.

**To be Completed by PM and/or "Competent Person"
Complete Form as Project Progresses and Maintain in Site Files.**

PHASE	TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
Pre-Planning	1. Excavation in Work Scope?				
	2. Underground Utilities Identified?				
	3. Competent Person Assigned?				
	4. Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?				
	5. EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)				
Identifying, Locating and Marking	6. Locating and Marking Checklist Initiated? (Attachment A)				
	7. Identification and Address of Property Determined, Including Nearest Intersection?				
	8. One-Call Agency Contacted?				
	9. Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only).				
	10. Additional Marker/Locator Identified?				
	11. Additional Marker/Locator Qualified?				
	12. Weston Self-Performing Location and Marking?				
	13. If Yes to 12 Above, Approval From Division EHS Manager?				
	14. Area of Excavation "White-Lined" by WESTON?				
	15. WESTON Present When Markings Completed?				
	16. All Utilities Marked? (Refer to Attachment A, Table 1)				
	17. All Markings Photo/Video Documented?				
	18. Area Checked for Signs of Previous Excavation? (Subsidence, new grass, patching, etc)				
	19. All Applicable Information Recorded on Attachment A?				
	20. Multiple Contractors Excavating On-Site?				
	21. Separate Locate Requests for All Contractors?				
	22. WESTON Subcontractors Excavating in WESTON White-Lined Area(s)?				
	23. If Yes to 22 Above, One-Call Agency Contacted to Determine if WESTON Subcontractor Can be Added to Existing Locate Ticket?				
Excavation Activities	24. Meeting and Site Walkover Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)				
	25. AHA and HASP Review Conducted With Personnel?				
	26. Do Site Activities Have Potential to Obliterate Utility Markings?				
Excavation Activities – Cont'd	27. If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?				

PHASE		TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	28.	Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 3 Feet of the Buffer Zone?				
	29.	Have Operator and Observer Reviewed Commands and Signals?				
	30.	Has WESTON-Required Buffer Zone Been Marked on Either Side of Markings Placed by Locator?				
Excavation Within Buffer Zone	31.	Is Excavation Within The Buffer Zone Absolutely Necessary?				
	32.	If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.				
	33.	If No to 32 Above, Has a Buffer Zone Exemption Request Been Approved? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.				
	34.	If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or, Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?				
	35.	If Yes to 34 Above, Have All of The Following Conditions Been Met? For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility? Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone? Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities? If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.				
Working Around Exposed Utilities	36.	If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?				
	37.	Have Spoils Been Placed as far Away From the Excavation as Feasible?				
	38.	Has the Utility Been De-Energized? (If Any Portion of the Buffer Zone around a Utility is Inside of the White-Lined Area)				
	39.	Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?				
Working Around Exposed Utilities – Cont'd	40.	If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?				
	41.	If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)				
	42.	Has the Isolation Point Been Tagged?				
Damage Discovery	43.	Has Pre-Existing Damage to a Utility Been Discovered During Excavation?				

PHASE	TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	44. If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?				
	45. If Yes to 43 Above, Have Photographs Been taken?				
Encountering or Contacting Underground Utilities	46. Have Utilities Been Encountered in Locations That Have Not Been Marked?				
	47. If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?				
	48. If Yes to 46 Above, Has the PM and Appropriate DSM Been Notified?				
	49. If Yes to 46 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				
	50. Have Excavation Equipment Come In Contact With Underground utilities?				
	51. If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				
	52. If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?				
	53. If Yes to 50 Above, Has the Area Been Secured?				
	54. If Yes to 50 Above, Have Emergency Responders Been Notified?				
	55. If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?				
	56. If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?				
	57. If Yes to 50 Above, Were Intrusive Activities Curtailed Until; Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?				
58. If Yes to 50 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)					

CHECKLIST COMPLETED BY:

NAME

SIGNATURE

DATE

NAME

SIGNATURE

DATE

FLD 34 UNDERGROUND UTILITIES – ATTACHEMENT C

UTILITY RESEARCH OPTIONS

In the course of determining and verifying underground utility location it is expected that a minimum of two (2) resources will be used. As a means of assisting the search for sources, the following is offered.

Records Sources:

- ☐ Utility Section of the State DOT or other Public Agency
- ☐ One-Call Center
- ☐ Public Service Commission or similar organization
- ☐ County Clerks Office
- ☐ Landowner
- ☐ Internet or Computer database
- ☐ Visual Site Inspection
- ☐ Utility Owner

From the Above Collect:

- ☐ Previous construction plans in the area
- ☐ Conduit maps
- ☐ Direct-Buried Cable records
- ☐ Distribution maps
- ☐ Service record maps
- ☐ As-built and record drawings
- ☐ Field notes
- ☐ County, city, utility owner or other geographic information system database
- ☐ Circuit diagrams
- ☐ Oral histories (current or previous employees, residents).

Review Records and Obtain Information For:

- ☐ Indications of additional and/or other available records
- ☐ Duplicate information that lends credibility to data
- ☐ Any additional need for clarifications from owners/others

FLD 34 UNDERGROUND UTILITIES – ATTACHMENT D SOURCES OF INFORMATION

Organizations

- Common Ground Alliance
<http://www.commongroundalliance.com/wc.dll?cga~toppage>
- Center for Subsurface Strategic Action (CSSA)
<http://underspace.com/cs/index.htm>
- DigSafely
<http://www.digsafely.com/digsafely/default.asp>
- National Utility Contractors Association (NUCA)
<http://www.nuca.com/>
- National Utility Locating Contractors Association (NULCA)
<http://underspace.com/nu/index.htm>
- Underground Focus Magazine
<http://underspace.com/uf/index.htm>
- NUCA State Listing of One-Call centers
<http://www.nuca.com/>
- Utility Safety Magazine
<http://www.utilitysafety.com/>

Vendors and Commercial Sites

- RadioDetection, Inc. (Detection Instruments)
<http://www.radiodee.com/>
- Heath Consultants (Detection Instruments)
<http://www.heathus.com/>
- Ben Meadows Company (Detection Instruments)
<http://www.benmeadows.com/cgi-bin/SoftCart.exe/index.html?E+scstore>
- So-Deep, Inc. (Complete Utilities Services)
<http://www.sodeep.com/>
- Concept Engineering Group, Inc. (Air Excavation Equipment)
<http://www.air-spade.com/index.html>
- Rycom Instruments, Inc. (Detection Instruments)

<http://www.rycominstruments.com/>

- Schonstedt Instrument Company (Detection Instruments)

<http://www.schonstedt.com/>

- Forestry Suppliers, Inc. (Fiberglass Probe – “Fiberglass Tile Probe”, Part #77543, Approx. \$20.00, Telephone 800-647-5368)

<http://www.forestry-suppliers.com/>

REFERENCES

- Common Ground Study of One-Call Systems and Damage Prevention Best Practices, August, 1999, Sponsored by US DOT.

Revised 0104

INTRODUCTION

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified because of formal training or documented experience.

Like all tools, hand tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools and power tools. Referenced by 29CFR1926 Subpart I and 29CFR1910 Subpart P.

GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS.

- Keep the work area clear of clutter.
- Keep work area properly illuminated.
- Maintain and keep tools sharpened, oiled and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.
- Repair or replace problem equipment immediately.
- Use three-prong (3) electric plugs, double insulated tools, and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.

- All hand-held power-driven tools must be equipped with "dead-man" control, so power will automatically be cut off upon release of the control by the operator.
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained which is to be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper venting exercised when used in enclosed spaces.
- Power-grinding machines shall have proper grounding. Work rests must be kept at a distance not to exceed 1/8 inch from the wheel surface.
- All persons using abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have appropriate wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. There are procedures for avoiding or minimizing risk such as: using mechanical devices for lifting, following procedures in FLD 12 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools are used, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 6.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.
- Handles designed to be used on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

TORSION TOOLS

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than

quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw

- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, as punches, or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to the base. When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

SCREWDRIVERS:

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

PLIERS:

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.
- Inspect installation frequently to make certain that it is free of breaks or cracks.

- Pliers shall be kept free from grease and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt shall be snug but not tight.

WRENCHES:

- Select the correct size of wrench for the job.
- Never use a pipe wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.

IMPACT TOOLS

Impact tools include various types of hammers like riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.
- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

HAMMERS:

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.

- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

CUTTING TOOLS

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

CHISELS:

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

KNIVES:

- Always cut away from the body.
 - Keep hands and body clear of the knife stroke.
 - Use a locking blade knife when possible.
 - Keep blades sharp.
- Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
 - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
 - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
 - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.

- Remove knives from carry on luggage and place in checked baggage.

POWERED TOOLS

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control ("dead-man switch") that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is removed. Safety clips, retainers or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and other flange are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. A Weston Solutions employee is not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

EXTENSION CORDS

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

SPECIALTY TOOLS

Pneumatic Powered Tools

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

Powder-Actuated Tools

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer's recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.

- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

GENERAL

Response personnel may encounter biological hazards that include endemic hazards as follows: animals, insects, molds and fungus, and plants. In addition, hazardous waste site personnel may be exposed to etiological agents (infectious diseases).

Endemic Biological Hazards

An important part of health and safety planning and protection includes identifying and understanding local flora and fauna. Animals, insects, molds and fungus, and poisonous plants vary from site to site, their likelihood of causing harm also varies. Risk assessment and protection protocol determinations include knowing the how, where and what of hazardous types of plants, animals, insects, or molds and fungus.

Animals

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

Poisonous snakes are common across the U.S. The major variables are the likelihood of encounter and the snake likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy area, or rocks.

Key factors to working safely include being alert, using care when reaching into or moving containers, and being familiar with the habits and habitats of snakes in the vicinity of an incident or site.

A snake bite warrants medical attention after administration of proper first aid procedures. Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

Questions and Answers about Rabies

Q. What is Rabies and how is it transmitted?

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

Q. What animals are most likely to be infected?

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

Q. How can you tell if an animal is rabies-infected?

A. Rabies infection is not always apparent. Signs to look for in wild animals are over aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

Q. What should you do if bitten by an animal you suspect is infected with rabies?

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up.

Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it.

Have the animal tested. A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

Q. Is there a cure for rabies?

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important.

Rabies is not curable once symptoms or signs of rabies appear.

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

Hantavirus

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of "Hantavirus"-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculatus*) as a primary reservoir host. Hantavirus has resulted in approximately a dozen deaths in the southwestern U.S. in recent months. The Center for Disease Control and Prevention (CDC) was concerned that the virus may have been distributed over a larger geographic area than originally suspected.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with activities that provide contact with infected rodents in rural/semirural areas.

Hantavirus symptoms begin with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital. Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan. Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with HEPA filters, eye protection, Tyvek coveralls, chemical resistant gloves, and disposable

boot covers. Strict decontamination requirements are needed. Double-bag, label, and require specific handling, packaging, shipping, storage, and analytical procedures to minimize the risks of exposure of collected mice. More detailed procedures can be obtained from Corporate Health and Safety.

For employees and facilities in rural/semirural areas: the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

Insects

Diseases that are spread by insects include the following: Rocky Mountain Spotted Fever or Lyme Disease (tick); Bubonic Plague (fleas); Malaria, and Equine Encephalitis (mosquito).

Lyme Disease is the second most rapidly spreading disease in the U.S.

Lyme Disease

1. Facts

- Definition:
 - Bacterial infection transmitted by the bite of a deer tick.
 - Prevalence (nationwide and other countries).
- Three stages/sizes of deer ticks:
 - Larvae
 - Nymph
 - Adult
- Tick season is May through October.
- Not all ticks transmit Lyme Disease.
- Ticks must be attached for several hours before Lyme Disease can be transmitted.
- Being bitten by a tick does not mean you will get Lyme Disease.

2. Prevention and Protection:

- Wear light-colored, tight-knit clothing.
- Wear long pants and long-sleeved shirts.
- Tuck pant legs into shoes or boots.
- Wear a hat.
- Use insect repellent containing DEET (follow manufacturer's instructions for use).

- Check yourself daily for ticks after being in grassy, wooded areas.
- Request information from the Health and Safety Medical Section regarding Lyme Disease.

3. If Bitten:

- Remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick.
- Wash your hands and dab the bite with an antiseptic.
- Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick, and the spot on your body where you were bitten.
- Monitor the bite for any signs of infection or rash.

4. Symptoms:

Early Signs (may vary from person to person)

- Expanding skin rash.
- Flu-like symptoms during summer or early fall that include the following:
 - Chills, fever, headache, swollen lymph nodes.
 - Stiff neck, aching joints, and muscles.
 - Fatigue.
- Later signs
 - Nervous system problems.
 - Heart problems.
 - Arthritis, especially in knees.

5. Upon Onset of Symptoms:

- Notify your Safety Officer (SO) and your supervisor.
- Submit incident report form.

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit. First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

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Fire ants are small red ants found primarily in southern and western states. There is some indication that if bitten a person may show allergic reaction in addition to severe pain.

It is important to note that animals may serve as hosts for insects which may spread diseases. Ticks carrying Lyme disease and Rocky Mountain spotted fever are found on grass, but may be carried on animals. Bubonic plague, which has emerged in parts of Colorado, New Mexico, and Arizona, is associated with fleas found on prairie dogs.

Other insect hazards include mosquitos and scorpions. There have been articles published recently indicating increases in encephalitis in Florida. Encephalitis is reportedly spread by mosquitos. The local health department should be contacted prior to working in areas where WESTON does not have good information about potential biological hazards.

Molds and Fungi

In addition to the previously discussed animal inhabitants of old buildings, which are often part of hazardous materials sites, birds often invade the buildings leaving behind debris and droppings which may contain molds and fungi in dry forms. Inhalation of this easily airborne dust can result in serious lung disease such as histoplasmosis.

There is a fungus that grows in soil indigenous to the San Joaquin Valley, parts of southern California, Arizona, and New Mexico. This organism can produce a disease called "Fever", "Valley Fever", or, technically, Coccidiomycosis when inhaled. Growing up in infected areas apparently provides a degree of resistance, which newcomers to the areas do not have.

Awareness of a hazard and the prudent use of respiratory protection are key factors to protection.

Plants

Toxic effects from plants are generally caused by ingestion of nuts, fruits, or leaves. Response personnel should also be concerned with plants like poison ivy, poison oak, and poison sumac, that produce adverse effects from direct contact. The usual effect is dermatitis or inflammation of the skin. The protective clothing and decontamination procedures used for chemicals also reduce the exposure risk from the plant toxins. Risk can be reduced by cleaning the skin thoroughly with soap and water after contact.

Biological Agents

Microbial hazards can occur when the materials handled by workers contain biological contamination. Biological contamination can be a problem if a chemical spill is mixed with sewage. Most bacteria that affects humans prefer a neutral environment (pH 7). Thus, an extremely acid or alkaline environment should destroy or inhibit bacterial growth. However, during neutralization, the environment could become more conducive to bacteria growth. In these situations, normal decontamination procedures will usually alleviate problems associated with worker contamination, although additional decontamination measures may be required for certain biological exposures.

Another source of infection for response workers is poor sanitation. Waterborne and foodborne diseases can be a problem if adequate precautions are not taken. Examples of waterborne diseases are cholera, typhoid fever, viral hepatitis, salmonellosis, bacillary dysentery, and amoebic dysentery. In an emergency response related to a disaster, water supplies may be affected. The source of water for a long-term remedial action is also important. In some locations, it may be necessary to transport water and food to the site. The food and water must be handled properly and come from an uncontaminated source.

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The response team must also avoid creating any sanitation problems by making sure that properly designed lavatory facilities are available at the work site. Note that OSHA requires proper sanitation measures and potable water at temporary job sites.

Tetanus is another form of biological hazard encountered on hazardous materials sites. Workers must be careful to avoid puncture hazards, wear appropriate protective clothing, and have current tetanus inoculations.

Medical wastes may be encountered on hazardous materials sites. Agents may be present in this waste that are still capable of causing infection. Generally, procedures for protection against chemical hazards are sufficient to protect workers. Full enclosure chemical protective clothing may be appropriate since these organisms may have the ability to penetrate the skin. One additional precaution is to use bleach or some other equivalent agent capable of destroying the biological organisms in the decontamination procedure.

Bloodborne Pathogens

In July of 1992, OSHA issued a final Standard for Protection of Workers Potentially Exposed to Bloodborne Pathogens (29 CFR 1910.1030). This standard primarily involves medical and research personnel and their exposure to blood or blood-containing fluids infected with Bloodborne Pathogens. Bloodborne pathogens are pathogenic microorganisms that may be present in human blood and may cause disease in humans. These pathogens include, but are not limited to, Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV).

These HIV and HBV organisms could potentially be present in viable states on hazardous waste sites, with Hepatitis Virus being the more likely to survive in temperatures outside the body temperature ranges.

The other potential for exposure would be to workers who could be infected. The OSHA Standard specifically includes first aid providers among workers covered by this standard.

The basic concept of this Standard is that medical care first aid workers must take the "universal precaution" of assuming that any blood-containing fluid, person bleeding, or equipment contaminated with blood are infected with both viruses.

Protection involves use of personal protection such as gloves, gowns, eye shields, surgical masks, one-way valve rescue breather devices. It also involves training, disinfectants, and decontamination.

Workers expected to administer first aid must have a basic understanding of Bloodborne Pathogens in order to protect themselves effectively from any hazards.

Completion of safety plans requires identification of and assessment of risk of exposure to biological hazards. This program deals primarily with two forms of infection (Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV)), which are of concern to workers who may come in contact with bodily fluids associated with blood.

At a minimum, WESTON's Bloodborne Pathogen Exposure Control Plan will be on site and implemented for each project for first aid providers. If medical waste is anticipated on a site, WESTON's Employee Exposure Control Plan for Hazardous Waste Workers will be implemented.

Hepatitis B Virus

Definition — The term "hepatitis" simply means an inflammation of the liver. This condition can be

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caused by a wide variety of agents including medications, alcohol, toxic or poisonous substances, and infectious agents such as viruses. Hepatitis B, formerly known as "serum" hepatitis, is the only form of viral hepatitis that poses a significant occupational threat in the health care environment.

Symptoms — HBV is a disease that causes liver damage, the severity of which can range from mild or even inapparent to severe or fatal. Of the infected individuals, 6-10% will become HBV carriers. Carriers are at risk of developing chronic liver disease, including active hepatitis, cirrhosis and primary liver cancer. Carriers are also infectious to others (USHHS and NIOSH, 1989).

Sources of Infection — The Hepatitis B virus has been isolated from various body fluids including blood, semen, vaginal secretions, breast milk, saliva, and serous fluid. Within the health care setting, however, Hepatitis B is thought to be transmitted primarily by percutaneous or permucosal blood through needle sticks or the splashing of blood or blood-tinged body fluids into the eyes or mouth.

Risk — There is a direct relationship between the likelihood of occupational Hepatitis B infection and the frequency of blood contact. Health care professionals (surgeons, operating room staff, pathologists, and emergency room personnel) exhibit a high incidence of exposure to Hepatitis B infection. The frequency of blood contact determines the level of risk.

Protective Measures

Protective measures against Hepatitis B infection include good hand washing practices, caution, and proper technique in the handling of the following potentially contaminated items: needles, sharps, supplies, and instruments. Excellent protective treatment for, or prevention of, this disease is afforded by both Hepatitis B immune globulin (HBIG) and by Hepatitis B vaccine. Either or both of these should be given as soon as possible after any documented exposure to blood (Johnson and Johnson, 1992).

Acquired Immunodeficiency Virus

Definition — Acquired Immunodeficiency Syndrome or AIDS is a severe viral disease recently introduced into the U.S. AIDS severely affects the immune system and is characterized by a multitude of opportunistic infections.

The AIDS virus is typical of most viruses. It cannot survive for any appreciable amount of time outside its human host. Its presence in the general environment is extremely unlikely and is limited to body secretions, primarily blood and semen. HIV is very susceptible to a large number of common household disinfectants since it is an unstable virus.

Symptoms — The outcome or manifestation of illness varies with individuals who are infected with the HIV virus.

Some infected persons have no disease symptoms and may not show outward signs of the disease for many years.

Some infected persons suffer less severe symptoms than do those with diagnosed cases of AIDS. These lesser symptoms may include loss of appetite, weight loss, fever, night sweats, skin rashes, diarrhea, tiredness, lack of resistance to infection, and swollen lymph nodes.

AIDS is the result of the progressive destruction of a person's immune system, which is the body's defense against disease. This destruction allows diseases to threaten the person's health and life that the body can normally fight. A particularly dangerous type of pneumonia and certain other infections often invade a

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body weakened by HIV. HIV can also attack the nervous system and cause damage to the brain. This may take years to develop. The symptoms may include memory loss, indifference, loss of coordination, partial paralysis, or mental disorder (USHHS and NIOSH, 1989).

Sources of Infection — The various modes by which HIV can be transmitted are well defined. Male homosexual and bisexual practices along with intravenous (IV) drug abuse are two major means of transmission.

Although not as efficient a mode of infection, heterosexual transmission does occur, and is increasing in incidence in several countries around the world. Comparatively, fewer individuals have contracted AIDS as the result of receiving contaminated blood or blood products. In addition, the advent of laboratory tests to detect infection with HIV has almost eliminated any possibility of this mode of transmission.

AIDS is not hereditary, however, it can be congenital. In fact, vertical transmission, which involves passage of the virus from an infected woman to her unborn child, is the third major means of transmission and accounts for the majority of cases of pediatric AIDS.

Risk — There is a common misconception that health care workers are at high risk for acquiring HIV infection through occupational exposure. Studies confirm the fact that this supposed risk is less than one percent. Of the thousands of health care workers in the U.S. and other parts of the world who have been exposed to HIV through patient contact, very few have developed subsequent infection. AIDS is a concern of immense proportion to the health care community. However, from an occupational health point of view there is little reason for undue concern regarding this virus.

Protective Measures

Simple use of good personal hygiene, common sense, and the barrier techniques which are discussed in this operating practice will help to prevent health care workers from contracting HIV infection or any other serious illness in the workplace (Johnson and Johnson, 1992).

Contents:

Purpose

Procedure

Inspection Follow-Up

Inspection Closure

Purpose:

To provide guidance on OSHA inspections conducted at WESTON project sites. OSHA inspections occur from time to time. A typical sequence of events is as follows:

- The OSHA inspector arrives at the site and introduces himself to the manager in charge of the operation.
- The inspector conducts a pre-inspection conference with the manager and other individuals as determined by the manager. At that time the scope of the inspection should clearly be described by the inspector.
- The inspector will perform the inspection, which typically includes a walk-through inspection of the work-site. This inspection may be limited to specific areas of the site, especially if it was initiated in response to a worker's complaint. The inspector may make notes or take pictures to document site conditions.
- The site inspection typically ends with a close-out conference during which the inspector provides tentative findings. In some cases the inspector may forego the close-out conference and issue a written citation after leaving the site. On occasion, inspections may require more than one day.
- OSHA inspectors seldom issue citations during the inspection, however, if an inspector observes an imminent hazard he/she can order a work stoppage. A citation is not considered to have been issued until it is in writing and received by mail or by another appropriate method.

It is WESTON's practice to cooperate with investigations. Information that is requested should be provided.

Requests for copies of documents, safety plans, etc. should not be provided without first obtaining approval by WESTON's Law Department. Under no circumstances should any attempt be made to mislead the Inspector. If the inspection is on a client site, WESTON will refer to the client's written procedures for handling OSHA inspections.

If the client's procedures differ significantly from WESTON's procedures, the Site Manager in consultation and agreement with the Division Safety Manager (DSM) and Corporate Counsel will document site-specific procedures and ensure that site personnel and client contacts are aware of these modifications.

Procedure:

Coordination of the OSHA inspection is the responsibility of the Site Manager with assistance from the Site Health and Safety Coordinator (SHSC). The Site Manager, the SHSC, or both will accompany the Inspector during all stages of the inspection. The following guidelines will apply:

- Treat the Inspector as a professional and with courtesy.
- Ask for the Inspector's credentials to verify that he is representing OSHA. Personnel who cannot demonstrate their affiliation with OSHA should not be allowed access to the site.
- Ensure there is a pre-inspection conference that is attended by both the Site Manager and the SHSC, at a minimum. If not stated during the pre-inspection conference, ask the nature of the inspection.
- Contact the client and, in order of priority, one of the following: the Division Safety Manager (DSM) or Corporate Environmental Health and Safety (CEHS), prior to taking the Inspector on-site. The DSM, Safety Officer (SO), or CEHS will notify the appropriate WESTON personnel including the following:
 - General Counsel
 - Corporate Environmental Health and Safety Director
 - Vice President, Human Resources
 - Division Manager(s) and other DSMs responsible for the project
 - Project Manager and Client Services Manager responsible for the project
 - Chief Operating Officer (COO)
- If there are any questions during the conference, contact WESTON Corporate Environmental Health and Safety Department for guidance.
- Note where and what observations are made and write down any comments. If the Inspector makes photographs or videotapes, take photographs or video footage that will document the conditions being recorded. If cameras or video recorders are not available at the site, at least document what shots were taken and what conditions existed, such as weather, work activities, etc. Record the names of any individuals to whom the Inspector speaks.
- At the end of the inspection, assure that there is a closing conference. Take full notes of all proceedings. Contact and debrief the DSM immediately following the closeout.
- Remember that subcontractor's conformance with OSHA regulations is considered the general contractor's responsibility. Do not rely on indemnification to protect WESTON. Act at all times in conformance with OSHA.
- Upon receipt of final reports or Notices of Violation from the Inspector, contact and provide copies to the following WESTON personnel:
 - DSM
 - Corporate Environmental Health and Safety Director
 - Corporate Counsel.
- The Inspector will be required to follow the same health and safety procedures and OSHA regulations and requirements as any employee or other person (such as confined space, personal protective equipment, etc.).
- All employees are to be reminded that the law and WESTON policy prohibit any retaliation against any person reporting health and safety concerns.

Inspection Follow-Up:

- The project PM will be responsible for assembling an inspection review and response team consisting of the PM, the appropriate DSM's, SO's, the Corporate Environmental Health and Safety Director and Health and Safety resources as needed.
- A chronology of event report will be started and any corrective actions deemed appropriate by the team will be taken and documented.
- OSHA has up to 6 months to issue a written Notice of Violation. However, OSHA typically will be able to complete a written Notice of Violation within 90 days. The Notice of Violation is not official until it is received. At this point, WESTON has 15 working days to decide to contest any violations and request an informal conference. An abatement plan will be required by OSHA, the team will be responsible for preparing this plan along with any rebuttal of the citation.

Inspection Closure:

- The chronology report will conclude when the abatement plan has been accepted and OSHA indicates, preferably in writing, that the violations have either been vacated or abated.

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APPENDIX D - INSTRUCTIONS FOR SAMPLE SHIPPING AND DOCUMENTATION

**INSTRUCTIONS FOR
SAMPLE SHIPPING
AND DOCUMENTATION**

November 1997

**Quality Assurance Management Section
U. S. EPA Region 9
San Francisco, CA**

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TYPE OF ACTIVITY.	Appendix A
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(REGIONAL) CHAIN OF CUSTODY RECORD.	Attachment 3
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SAMPLE SHIPMENT INFORMATION	Attachment 5

1.0 GENERAL

- 1.1 When all paperwork has been completed by the sampler and samples are ready to be shipped, place the laboratories' copies in a plastic bag and tape it to the inside of the lid of the cooler(s). For CLP Analytical Services, Contract Laboratory Analytical Services Support's (CLASS) copies must be submitted within 5 days of sampling. The Region's copies may be submitted at that time or at the end of the sampling event. If the sampling event covers an extended length of time, the Region's copies must be submitted weekly. (Note: The RSCC coordinator will not forward CLASS's copies. They will be returned to the sampler.)

QAMS address:

U.S. EPA Region 9
Quality Assurance Program (PMD-3)
75 Hawthorne Street
San Francisco, CA 94105
Attn.: RSCC Coordinator

CLASS address:

Contract Laboratory Analytical Services Support
DynCorp
2000 Edmund Halley Dr.
Reston, VA 20191-3436
Attn.: Region 9 Coordinator

- 1.2 For analyses performed by the Regional Laboratory, DO NOT send any copies of the paperwork to the Contract Laboratory Analytical Services Support (CLASS).

1.3 DISTRIBUTION OF COPIES

1.3.1 CLP ANALYTICAL SERVICES

1.3.1.1 ORGANIC TRAFFIC REPORT/CHAIN-OF-CUSTODY FORM

- a. Blue (original) copy to QAMS, Region 9
- b. Pink (second) copy to CLASS
- c. White (third) and Yellow (fourth) copies accompany samples to laboratory
- d. Photocopy for sampler's files

1.3.1.2 INORGANIC TRAFFIC REPORT/CHAIN-OF-CUSTODY FORM

- a. Green (original) copy to QAMS, Region 9
- b. Pink (second) copy to CLASS
- c. White (third) and Yellow (fourth) copies accompany samples to laboratory
- d. Photocopy for sampler's files

1.3.2 REGIONAL ANALYTICAL PROGRAM (RAP):

1.3.2.1 RAP CHAIN-OF-CUSTODY FORM

- a. White (original) copy to laboratory with samples
- b. Pink copy to QAMS, Region 9
- c. Photocopy for sampler's file

1.3.3 FIELD QA/QC SUMMARY FORM

- a. Original to QAMS, Region 9
- b. Photocopy for sampler's files

2.0 SAMPLE SHIPMENTS

2.1 Calling in shipments to the RSCC coordinator

2.1.1 Call the EPA Regional Sample Control Center (RSCC) coordinator on a daily basis, even if no shipments were made. The RSCC coordinator may be reached at (415) 744-1498.

2.1.2 Try to stick to the sampling schedule. If this is not possible, let the RSCC coordinator know immediately so other arrangements can be made.

2.1.3 Notify the RSCC coordinator within 12 hours of sample shipments. Calling in sample shipments to the RSCC coordinator is MANDATORY. Provide the following information to the RSCC coordinator:

1. Case number
2. Name of Laboratory
3. Date of shipment
4. Carrier and airbill number
5. Number of samples shipped by matrix and analysis type
6. Number of coolers shipped
7. Information on completions, changes, delays, etc.

2.2 Special shipments (i.e., Saturday delivery/pickup)

2.2.1 General - Friday shipments for Saturday delivery/pickup must be called in by noon (12:00 pm) Friday. This is to enable the RSCC coordinator to pass the information on to CLASS or to the laboratories. Samplers may not contact the laboratories directly. (Laboratories do not have to accept notification of delivery of samples from sources other than CLASS or RSCC.)

2.2.2 Regional Laboratory - The Regional Laboratory is located within a gated compound that is closed on weekends and holidays. Designated laboratory personnel will pickup the samples at the Federal Express office, take them to the laboratory and place them inside the refrigerators. If the following shipping instructions are not followed, an

unsuccessful delivery attempt will be made to the Regional Laboratory. In addition, the staff member on call will not be able to pickup the samples, since they will not be at the Federal Express office.

To ensure that samples are held at the Federal Express office, please be sure to complete the following items:

1. On the lower left side of the Federal Express airbill, "For HOLD at FedEx Location check here," mark the box for "Hold Saturday."
2. In Section 3 of the airbill, print the following Federal Express office address:

1600 63rd Street
Emeryville, CA 94608

Federal Express may affix stickers to the coolers. Be sure they read "SATURDAY FEDERAL EXPRESS CENTER HOLD" or something similar. Under no circumstances should a "SATURDAY DELIVERY" sticker be placed on the cooler.

If a carrier other than Federal Express is used, please call the RSCC coordinator (415-744-1498) to make special arrangements.

- 2.2.3 Most CLP laboratories and other commercial laboratories contracted by QAP are staffed on Saturdays. Therefore, coolers can be delivered directly to these laboratories. In this case, the "SATURDAY DELIVERY" sticker should be placed on the cooler.

- 2.2.4 Laboratories may request advance notification of the arrival of certain types of samples, such as samples with very short holding times (e.g., Cr +6) that will be hand delivered to the laboratory. Required deadlines for notification of sample shipments in these special cases will be determined on a case by case basis. The RSCC coordinator will inform the samplers as to when notification of sample delivery is required (e.g., by noon on the day samples will be delivered). This is to facilitate the laboratory(ies) having personnel available to analyze the samples as soon as they arrive.

2.3 Cooler Return

Samplers are responsible for providing laboratories with a means to return coolers to their place of origin. The easiest way is to enclose an airbill with return shipping instructions (i.e., the address filled in as to where the coolers are to be returned to) and an account number to charge shipping costs to.

Samplers using EMFAC coolers should refer to Section 7 of the

EMFAC Users Guide for cooler return instructions. EPA contractors should contact their EPA Project Officer for details on acceptable modes of cooler return and shipping cost reimbursement.

3.0 CLP ANALYTICAL SERVICES (CLPAS) TRAFFIC REPORT/CHAIN-OF-CUSTODY FORMS FOR ORGANIC AND INORGANIC ANALYSES

3.1 CASE DOCUMENTATION

Complete this form when collecting CLPAS samples. See Attachments 1 through 3 for examples.

Enter the CLPAS case number in the box(es) located in the upper right corner of the form. CLPAS case numbers have the format "xxxxx" (e.g., 18123).

3.2 HEADER INFORMATION

3.2.1 Box 1 - PROJECT CODE/SITE INFORMATION

Enter the Project Code (i.e., \$F), Site Name, City, State, Site Spill ID. (Note: the information entered here does not go through to the laboratory's copies.)

If sampling is not under the Superfund program, enter the Account code (account to be billed), any Regional Information and the name of the program (e.g., RCRA) in the box titled "Non-Superfund program."

3.2.2 Box 2 - REGIONAL INFORMATION

Enter the Region number, the name of your sampling company, and your name and signature in the designated spaces.

3.2.3 Box 3 - TYPE OF ACTIVITY

Check the appropriate box(es) for the type of activity for this sampling event. See Appendix A for acronym definitions.

3.2.4 Box 4 - SHIPPING INFORMATION

Enter the date shipped, the carrier (e.g., Federal Express, Airbourne, etc.) and the air bill number in the appropriate spaces.

3.2.5 Box 5 - SHIP TO

Enter the laboratory name, full address and laboratory contact (e.g., Sample Custodian).

3.2.6 Box 6 - PRESERVATIVE

EMFAC Users Guide for cooler return instructions. EPA contractors should contact their EPA Project Officer for details on acceptable modes of cooler return and shipping cost reimbursement.

3.0 CLP ANALYTICAL SERVICES (CLPAS) TRAFFIC REPORT/CHAIN-OF-CUSTODY FORMS FOR ORGANIC AND INORGANIC ANALYSES

3.1 CASE DOCUMENTATION

Complete this form when collecting CLPAS samples. See Attachments 1 through 3 for examples.

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3.2.1 Box 1 - PROJECT CODE/SITE INFORMATION

Enter the Project Code (i.e., \$F), Site Name, City, State, Site Spill ID. (Note: the information entered here does not go through to the laboratory's copies.)

If sampling is not under the Superfund program, enter the Account code (account to be billed), any Regional Information and the name of the program (e.g., RCRA) in the box titled "Non-Superfund program."

3.2.2 Box 2 - REGIONAL INFORMATION

Enter the Region number, the name of your sampling company, and your name and signature in the designated spaces.

3.2.3 Box 3 - TYPE OF ACTIVITY

Check the appropriate box(es) for the type of activity for this sampling event. See Appendix A for acronym definitions.

3.2.4 Box 4 - SHIPPING INFORMATION

Enter the date shipped, the carrier (e.g., Federal Express, Airbourne, etc.) and the air bill number in the appropriate spaces.

3.2.5 Box 5 - SHIP TO

Enter the laboratory name, full address and laboratory contact (e.g., Sample Custodian).

3.2.6 Box 6 - PRESERVATIVE

This box provides a list of commonly used preservatives. Enter the appropriate preservative in Column D. If you enter "5" on the Organic Traffic Report or "7" on the Inorganic Traffic Report indicating "Other", specify the preservative used at the bottom of the "Sample Documentation" area.

If you are using more than one type of preservative, you may either note the preservatives in the box specifically under the requested analyses (e.g., in the Cyanide box enter "2") or list them, separated by commas, in the same order as the checked sample analyses. (Alternatively, the analyses may be listed on separate lines.)

3.2.7 Box 7 - SAMPLE DESCRIPTION

This box provides a list of the description/matrices of the samples that are collected. Enter the appropriate description in Column A.

3.3 SAMPLE DOCUMENTATION

3.3.1 SAMPLE NUMBERS

Carefully transcribe the CLPAS sample numbers from the printed labels onto the Organic or Inorganic Traffic Report/Chain-of-Custody forms in the column labeled "CLP Sample Numbers".

CLPAS sample numbers have the following formats: YX123 for organic and MYX123 for inorganic samples. See Appendix B for examples.

3.3.2 Column A - SAMPLE DESCRIPTION

Enter the appropriate sample description code from Box 7.

NOTE: Item #6 "Oil" and Item #7 "Waste" are for RAP projects only. Do not ship oily samples or waste samples without making prior arrangements with the EPA.

3.3.3 Column B - CONCENTRATION

Enter "L" for low and "M" for medium concentration samples. (Prior arrangements must have been made with the ESAT RSCC coordinator, CLASS and the laboratories accepting the samples before shipping medium concentration samples. At this time, high concentration samples must be scheduled through the RAP system.)

NOTE: Medium concentration samples must be shipped in metal cans.

3.3.4 Column C - SAMPLE TYPE COMPOSITE/GRAB

This box provides a list of commonly used preservatives. Enter the appropriate preservative in Column D. If you enter "5" on the Organic Traffic Report or "7" on the Inorganic Traffic Report indicating "Other", specify the preservative used at the bottom of the "Sample Documentation" area.

If you are using more than one type of preservative, you may either note the preservatives in the box specifically under the requested analyses (e.g., in the Cyanide box enter "2") or list them, separated by commas, in the same order as the checked sample analyses. (Alternatively, the analyses may be listed on separate lines.)

3.2.7 Box 7 - SAMPLE DESCRIPTION

This box provides a list of the description/matrices of the samples that are collected. Enter the appropriate description in Column A.

3.3 SAMPLE DOCUMENTATION

3.3.1 SAMPLE NUMBERS

Carefully transcribe the CLPAS sample numbers from the printed labels onto the Organic or Inorganic Traffic Report/Chain-of-Custody forms in the column labeled "CLP Sample Numbers".

CLPAS sample numbers have the following formats: YX123 for organic and MYX123 for inorganic samples. See Appendix B for examples.

3.3.2 Column A - SAMPLE DESCRIPTION

Enter the appropriate sample description code from Box 7.

Note: Item #6 "Oil" and Item #7 "Waste" are for RAP projects only. Do not ship oily samples or waste samples without making prior arrangements with the EPA.

3.3.3 Column B - CONCENTRATION

Enter "L" for low and "M" for medium concentration samples. (Prior arrangements must have been made with the ESAT RSCC coordinator, CLASS and the laboratories accepting the samples before shipping medium concentration samples. At this time, high concentration samples must be scheduled through the RAP system.)

NOTE: Medium concentration samples must be shipped in metal cans.

3.3.4 Column C - SAMPLE TYPE COMPOSITE/GRAB

Enter the type of sample you collected. A composite is a sample composed of more than one discrete sample. A grab is a discrete sample.

3.3.5 Column D - PRESERVATIVE USED

Enter the preservative used from Box 6.

3.3.6 Column E - CLPAS ANALYSIS

Check the analytical fractions requested for each sample, for example, VOAs, BNAs and Pesticides/PCBs are for low/medium concentration organics. Total metals and cyanide are for low/medium concentration inorganics.

NOTE: If dissolved metals are requested, a note must be added indicating that the samples have been field filtered and that digestion is required. See Attachment 2 for an example.

3.3.7 Column F - REGIONAL SPECIFIC TRACKING NUMBERS OR TAG NUMBERS

Region 9 does not issue tracking numbers or tag numbers. Samplers may use this column for sampler specific tracking numbers or for "Special Instructions". If you choose to use this as "Special Instructions", be sure to note, at the bottom of the "Sample Documentation" area, what the special handling is. The number and type of containers could be entered here. (e.g., 3-40 mL, 6-1L)

3.3.8 Column G - STATION LOCATION NUMBER

Enter the station location in the space provided.

3.3.9 Column H - MO/DAY/YEAR/TIME OF SAMPLE COLLECTION

Record the month, day, year and time (use military time, e.g., 1600 = 4:00 pm) of sample collection.

3.3.10 Column I - SAMPLER INITIALS

Enter your initials.

3.3.11 Column J - CORRESPONDING CLP ORGANIC/INORGANIC SAMPLE NUMBER

Enter the corresponding CLP sample number for organic or inorganic CLPAS analysis.

3.3.12 Column K - DESIGNATED FIELD QC

NOTE: This column is NOT to be used for the designated laboratory QC samples. Information entered here is not reproduced onto the laboratories' copies.

Enter the appropriate qualifier as listed below for "Blind" Field QC samples in this column. (NOTE: All samples must have a qualifier.)

<u>Blind Field QC</u>	<u>Qualifier</u>
Blind Blanks (field, etc.)	B
Blind Field Duplicates	D
Blind Field Spikes	S
Blind PE Samples	PE
All other field samples	--

"B" = These are blanks and include trip blanks (T), field blanks (F) and equipment blanks (E). Blanks may be further identified by the letter in parenthesis. For example, B(T) indicates that the sample is a trip blank.

"D" = These are field duplicates. Do not include samples designated as laboratory duplicates. The primary sample is identified with "--" and the duplicate is given "D" in column K. In addition, the station locations should also identify the primary and duplicate samples. For example, MW-1 is the primary sample and MW-1B is the duplicate sample.

"S" = These are spiked field samples and are generated by field personnel

"PE" = These are performance evaluation samples. They are spiked samples but are not field samples. They are usually prepared by other than field personnel.

"--" = All other samples not designated as blind field QC samples are given this qualifier.

3.4 "SHIPMENT FOR CASE COMPLETE (Y/N)"

This should reflect the status of the samples scheduled to be shipped to a laboratory for a specific case. Only when ALL samples scheduled for shipment to a laboratory for a specific case have been shipped is the case complete.

3.5 "PAGE 1 OF ____"

Enter the number of Traffic Report/Chain-of-Custody Record form(s) enclosed in each cooler. The form(s) accompanying each cooler must list only those samples contained in that cooler.

3.6 "SAMPLE USED FOR SPIKE AND/OR DUPLICATE"

Enter the sample number of the sample designated for laboratory spike and/or duplicate analysis. This is also known as the Laboratory QC sample. This sample should be included in the first shipment to the laboratory and in the first shipment for each subsequent sample delivery group (SDG).

DO NOT enter samples designated as blind field duplicates in this block.

3.7 "ADDITIONAL SAMPLER SIGNATURES"

Record additional sampler signatures that are different from that in Box 2.

3.8 "CHAIN OF CUSTODY SEAL NUMBER"

Enter the Chain of Custody Seal Number used to seal the cooler, if applicable.

3.9 Instructions summarizing CLP sample volumes, packaging and shipment reporting requirements are printed on the back of the Traffic Reports.

4.0 REGIONAL ANALYTICAL PROGRAM (RAP) CHAIN-OF-CUSTODY FORMS

4.1 CASE DOCUMENTATION

Complete this form when collecting RAP samples. See Attachment 4 for an example.

4.1.1 PROJECT NUMBER

Enter the RAP case number in this box.

4.1.2 PROJECT NAME

Leave this space blank.

4.1.3 SAMPLERS (Signature)

Record all sampler signatures in this box.

4.2 SAMPLE DOCUMENTATION

4.2.1 SAMPLE NUMBERS

No sample numbers are provided. Samplers should designate their own numbers and enter them in the space labeled STA.NO.

4.2.2 DATE

Enter the month, day and year the sample was collected in the "DATE" column.

4.2.9.3 SAMPLE USED FOR SPIKE AND/OR DUPLICATE

Enter the sample number designated for spike and/or duplicate analysis. This is also known as the Laboratory QC sample. This sample should be included in the first shipment to the laboratory and in the first shipment for each subsequent sample delivery group (SDG).

4.3 AIRBILL NUMBER

----- The airbill number should be entered on the first signature line, in the box marked "Received by: (Signature)".

4.4 "REMARKS" BOX

Located in the lower right hand corner of the Chain of Custody is a box labeled "Remarks". The following items should be entered there.

4.4.1 CHAIN OF CUSTODY SEAL NUMBER

Enter the Chain of Custody Seal Number used to seal the coolers, if applicable, in the box labeled "Remarks", in the lower right-hand corner.

4.4.2 LABORATORY NAME

Enter the Laboratory name in the box labeled "Remarks", in the lower right-hand corner.

4.4.3 SHIPPING COMPLETE?

Enter "yes, shipping is complete" or "No, shipping is not complete" in the box labeled "Remarks", in the lower right-hand corner.

4.4.4 CARRIER

Enter the carrier (e.g., "Fed Ex") in the box labeled "Remarks", in the lower right-hand corner.

5.0 SAMPLE BOTTLES

5.1 Sample bottles be labeled with the following information:

- a. Case number
- b. Date/Time of collection
- c. Matrix/Concentration
- d. Station Location
- e. Sample number (CLP or sampler designated)
- f. Analysis
- g. Preservative

4.2.3 TIME

Enter the time (using military time) in the "TIME" column.

4.2.4 COMP/GRAB

Check the kind of sample collected in the composite or grab column.

4.2.5 STATION LOCATION

Enter the sample site location in the space provided.

4.2.6 SAMPLE MATRIX

For each sample, enter the appropriate sample matrix description in the right third portion of the "STATION LOCATION" column.

4.2.7 NO. OF CONTAINERS

Enter the total number of sample containers collected for each matrix at each station location.

4.2.8 SAMPLE ANALYSES

There are six slanted columns to be used to specify the kind of analysis to be performed by the laboratory. Enter the appropriate analysis in each column. Mark the box of the appropriate analysis for each sample collected.

4.2.9 REMARKS

The items listed below are to be included in this area on the appropriate sample line.

4.2.9.1 CONCENTRATION

Enter "L" for low concentration, "M" for medium concentration and "H" for high concentration.

NOTE: Medium and high concentration samples must be shipped in metal cans.

4.2.9.2 PRESERVATIVE USED

Enter the preservative used.

If more than one type of preservative is used for a sample, separate the preservative references with commas. The sequence of the reference numbers must follow the sequence of the requested "RAP Analysis" parameters that are recorded in the analysis columns.

5.2 Pre-printed, self-adhesive labels are provided for CLPAS Organic, CLPAS Inorganic and RAP samples.

5.2.1 Transcribe the appropriate sample number onto the corresponding bottle label and/or affix the sample number label onto the bottle.

5.2.2 Destroy all unused labels or return them to the ESAT RSCC coordinator. DO NOT use them for future samplings. New sample numbers will be assigned.

6.0 FIELD QA/QC SUMMARY FORM

6.1 Complete one form per laboratory per matrix for each sampling event. For long term projects, complete a form(s) after each week of sampling. Complete the header portion even if no QA/QC samples were provided..

6.2 Complete all applicable entries. Please use the appropriate sample numbers for each laboratory. (e.g., for the laboratory performing CLPAS organics, use the CLP organic sample numbers, YX123, etc. For the laboratory performing RAP analyses, use the RAP sample numbers, SY0123, etc.) Please do not use station locations. If a laboratory is performing more than one type of analysis, list all applicable sample numbers.

6.3 This form is very important for validation purposes. The validators will compare the results of duplicates and assess the quality of blanks, if they know which samples they are. Failure to provide this information will delay the completion of validation.

TYPE OF ACTIVITY

Check the box which describes the funding lead for this sampling event:

Funding Lead

SF = Superfund
PRP = Potentially Responsible Party
ST = State
FED = Federal

Check one or more boxes, as appropriate, which describe the task of this sampling event:

Pre-Remedial

PA = Preliminary Assessment
SSI = Screening Site Investigation
LSI = Listing Site Investigation

Remedial

RIFS = Remedial Investigation Feasibility Study
RD = Remedial Design
O&M = Operations and Maintenance
NPLD = National Priorities List

Removal

CLEM = Classic Emergency
REMA = Removal Assessment
REM = Removal
OIL = Oil Response
UST = Underground Storage Tank Response

CLP SAMPLE NUMBERS

Each sample is assigned a unique sample number. A "sample" is defined as follows:

- one matrix, e.g., water, soil/sediment, fish, etc.
- one station location
- one analytical program, e.g., CLPAS organics, CLPAS inorganics or a RAP analysis
- one laboratory

Sample numbers for CLPAS analyses:

- CLPAS Organic sample numbers consist of five alpha-numerics, always beginning with "Y".

Example - YJ386

- CLPAS Inorganic sample numbers consist of six alpha-numerics, always beginning with "MY"

Example - MYG528

Examples for assigning sample numbers:

- CLPAS Volatiles & CLPAS Pesticides/PCBs receive the SAME SAMPLE NUMBER, if the samples are:
 - the same matrix
 - part of the same analytical program, e.g., CLPAS organics
 - from the same station location
 - going to the same laboratory
- CLPAS Volatiles & CLPAS Pesticides/PCBs receive DIFFERENT SAMPLE NUMBERS, if the samples are:
 - the same matrix
 - part of the same analytical program, e.g., CLPAS organics
 - from the same station location
 - going to different laboratories
- CLPAS Volatiles & CLPAS Metals receive DIFFERENT SAMPLE NUMBERS, if the samples are:
 - the same matrix
 - part of different analytical programs, e.g., CLPAS organics & CLPAS inorganics
 - from the same station location
 - going to the same laboratory

